A Naval Safety Center Publication

approach

JULY 1972 THE NAVAL AVIATION SAFETY REVIEW

Fire in Flight

Living with an aircraft discrepancy is like living with a snake; both have a tendency to rise up and strike you when you least expect it.

TAKEOFF in the C-130 *Hercules* was normal, and 5 minutes later the aircraft was climbing through 7500 feet. The after-takeoff checklist was complete and the AC had just switched seats with the 2P when a loud "thump" was heard. The aircraft shuddered.

The 2P, now in the left seat, exclaimed over the ICS, "That felt like a bird strike!" The AC looked out the right window and noticed a reflection of flames on the No. 4 engine nacelle. He thought the No. 3 engine was on fire. He turned to execute engine fire shutdown procedures but noticed there were no fire warning indications for *any engine.*

As he looked again at the No. 4 engine, the 2P notified him that the left wingtip was on fire. The flight engineer isolated the port wing bleed air system. The AC

secured the No. 1 engine, using engine fire in flight shutdown procedures. He still had no indication of an engine fire but secured it as a precautionary measure in the event it had contributed to the fire. At the suggestion of the 2P, power was reduced on all engines to flight idle.

The 2P put the aircraft in a nose down attitude in an attempt to blow out the fire by increasing airspeed. The AC notified approach control of the emergency and got on the controls with the 2P who was finding the aircraft increasingly difficult to control. Meanwhile, the wing fire continued to burn brightly.

Passing 4000 feet the 2P sighted a farmer's field off to the left. This was fortunate because control of the aircraft had become marginal. In spite of both pilots' efforts to maintain a constant heading, the aircraft continued a slight turn to the left.

At about 1000 feet, the pilots started slowing the *Hercules*. At 400 feet, airspeed was down to 160 knots and dropping. Since there was a row of tall trees bordering the landing field, the 2P added a little power and raised the nose slightly. The aircraft passed over the trees at 100 feet with 135-150 knots airspeed.

Just prior to touchdown, the pilots flared the aircraft slightly and "greased" it onto the field. Impact was relatively soft, and the C-130 came to a stop after sliding about 650 feet.

The cockpit was secured, and the crew rapidly evacuated the aircraft. There were no injuries. The aircraft burned for about 30 minutes before the fire was

extinguished by local volunteer firemen.

It was later determined that the aircraft would have soon become uncontrollable. The pilots did an outstanding job of assessing the situation and expeditiously getting the aircraft down without injury to its 16 occupants.

The most probable cause of the fire was a short in the cannon plug for the No. 1 fuel quantity gage. This allowed 115 volts a.c. current to be routed to the internal fuel tank wiring. An arc or spark apparently jumped from the wiring to ground at some point in the tank.

Such an arc or spark would not cause an explosion or fire if submerged in fuel. However, it is suspected that sufficient fuel had been burned to leave space above the fuel which contained a suitable fuel-air mixture for ignition by the arc. (Refer to NAVSAFECEN Flight Advisory 5-72, reprinted in the accompanying box.)

Investigation revealed an uncorrected aircraft discrepancy of long standing, i.e., a malfunctioning fuel tank indicator which was first griped more than 2 months before the accident. This discrepancy was not considered cause for downing the aircraft. The yellow sheet discrepancy read, "No. 1 main fuel tank reads off scale at all times." Corrective action read, "Repaired coax cable, checks good," and "Repaired cannon plug, checked good."

Unfortunately, this discrepancy was not fully corrected by such action. The same or related discrepancy was written up five more times during the next 2 weeks. In each case, corrective action was taken, but the problem was not eliminated.

The discrepancy was aggravating to be sure, but was not considered to be a downing gripe. No one realized that it had the potential to cause an accident. Therefore, in the face of heavy operational commitments and limited time within which to perform corrective maintenance, the squadron continued to live with this "minor" gripe.

Maintenance personnel verbally advised the flight engineer on the next flight to leave the fuel quantity indicator circuit breaker out to "prevent the indicator from continuing to run." This advice was passed on verbally from one engineer to the next – for a time. This system of communication eventually broke down (about 50 days later). Sometime prior to the last flight the circuit breaker was pushed in. This allowed 115 volts a.c. to be introduced into the fuel tank wiring which eventually led to the wing fire.

There are times when it is necessary to operate aircraft with minor discrepancies. Nevertheless, this accident suggests several precautions:

NAVSAFECEN Flight Advisory 5-72
Danger From Fuel Quantity Indicators

THE INVESTIGATION of a recent accident involving inflight explosion and fire in a wing fuel tank revealed that it is possible to generate a 115 volt electrical arc within the fuel tank through the path of the fuel quantity indicator and associated wiring.

The introduction of 115 volts alone should not cause an explosion, but coupled with a wiring short within the tank it could be catastrophic.

There are two ways spurious voltage may be introduced. The first is remote and lies in the possibility of an internal electrical malfunction within the fuel quantity indicator. The second and more likely possibility is the accidental grounding of the 115 volts power cable to one of the fuel tank electrical leads at a cannon plug connection during maintenance action of the system.

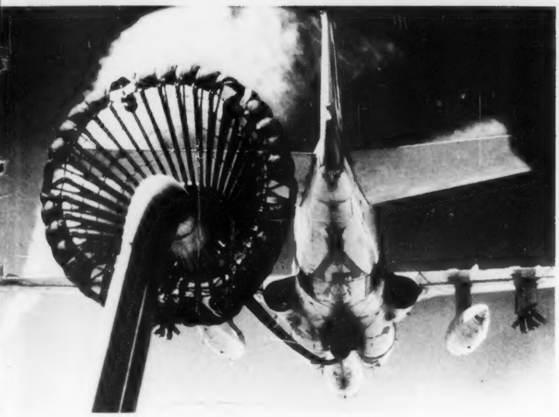
For NAVAIRSYSCOMHQ: Recommend that maintenance procedures for correcting fuel quantity indication discrepancies be revised to provide that any fuel quantity indicator with a known discrepancy be disabled before release for flight or before ground maintenance by pulling and tagging the indicator circuit breaker where applicable. Further recommend prohibit inflight troubleshooting of fuel quantity indicating system which would involve connecting or disconnecting cannon plugs.

(1) Beware of repeat discrepancies on a system or piece of equipment. Each discrepancy in itself may indeed appear to be minor, but taken altogether, could indicate major trouble. Don't live indefinitely with aircraft discrepancies, even the "minor" ones.

(2) Ensure that both the discrepancy and associated maintenance actions are properly documented. It's the only way to ensure that all concerned get the word. It has been proven time and again that the verbal system will break down sooner or later – and usually sooner.

(3) Recognize the value of standard publications such as NATOPS, MIMS, etc. First, when a lesson is learned through costly experience as in this case, ensure that it is documented in appropriate publications. Secondly, *use* these publications on each appropriate occasion. Only in this way will such lessons be preserved for future benefit.

FUELING FUMBLE



A SECTION of A-6As rendezvoused with a KA-6D for some practice VFR refueling. At 300 KIAS and 9000 feet the flight of three proceeded south in right echelon.

No. 3 aircraft (wingman in the section) crossed to the left side of the tanker without clearance, leaving the section leader on the right side. He then requested that the tanker "stream."

The refueling drogue was extended at 270 KIAS. As the tanker continued to decelerate, a ready light was obtained. The wingman positioned himself on the drogue without clearance from the tanker, observed a yellow ready light, and approached the basket.

The tanker BN noted that his aircraft had decelerated to 250 KIAS. He also observed that the aircraft on his right wing (the section leader) was moving back. Believing this to be the receiving aircraft, he reset response on the tanker package. During reset time the wingman engaged the drogue.

A standing wave was set up in the hose. The MA2 coupling failed and the basket separated from the hose. The hose whipped violently and sprayed fuel over the receiving *Intruder* (wingman). Fuel was ingested into the intakes. As the pilot reduced power to IDLE and backed away from the flailing hose, a double flameout occurred.

The powerless aircraft then dove away from the tanker. The pilot confirmed flameout, advanced throttles to MRT, and depressed the right engine airstart button. The BN hit the pilot on the arm and gestured for him to pull the ram air turbine. The pilot retarded the throttles to IDLE again, pulled the ram air turbine, and attempted another airstart.

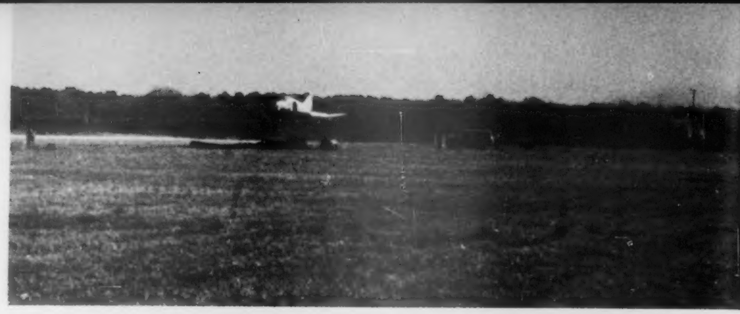
Relight was successful at 280 KIAS between 4500 and 5000 feet, nose-down. An emergency was declared. The A-6 returned to and landed safely at homebase.

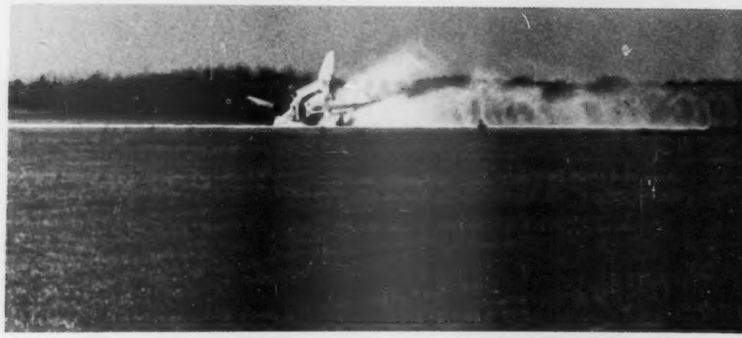
Meanwhile, the section leader told the tanker that the drogue basket had separated. The tanker pilot secured the refueling power switch and the fuel transfer switch. Turning toward open water, he contacted the controlling facility and entered a restricted area to jettison the remaining hose.

The jettison attempt failed to separate hose from aircraft. During subsequent landing rollout at homebase, the trailing hose snagged the arresting gear and separated from the aircraft. Postflight inspection revealed that the guillotine had fired, but merely crimped the hose. The hose tore off at the aft (second) crimp. A safety UR was submitted on the guillotine device.

The cause of this mishap was pilot error (wingman of receiving aircraft) in that he did not adhere to prescribed procedures. He left his position in the flight *without* clearance and attempted to engage the drogue *without* clearance from the tanker. Fuel ingestion caused explosions which resulted in limited damage to his aircraft.

The reporting command stated that the wingman exhibited a lack of flight discipline. Likewise, the flight leader demonstrated a lack of flight leadership. Both pilots were scheduled for additional training.






NAVY


NAVY

THE BOGUS BOLT

AN F-4B *Phantom* pilot entered the break at homefield following a routine ferry flight. Downwind he dropped gear and flaps but the wheels warning light remained on. The gear and flaps indicator showed the nose gear "up and locked." Since utility hydraulic pressure was normal, the gear was recycled with no change. The pilot then made a low approach down the runway for a gear check. Tower personnel and a pilot awaiting takeoff confirmed the gear to be up.

The pilot switched to base frequency to discuss the problem. He was told to recycle the landing gear again. The nose gear remained up and locked. By this time he had been joined by another aircraft whose pilot stated that the NLG door didn't move during the recycle.

An attempt was made to lower the gear by the emergency pneumatic method. This was unsuccessful as was applying positive and negative G. The squadron informed the pilot that runway foaming would be completed in about 15 minutes. He was also advised that a squadron LSO would be on station for the landing. Fuel state at that time was 3900 lbs. He switched to tower frequency where the LSO briefed him on desired landing procedures. He was advised to make a slightly fast approach and to touch down on centerline before reaching the foam.

After the runway was prepared, the pilot turned off the 180 with 2600 lbs of fuel. He flew the approach exactly as briefed. (See photos.) After touchdown, the nose was eased onto the foamed runway and the engines were secured. The drag chute was not deployed because of a crosswind which might have made it difficult to keep the aircraft aligned on the foam. The *Phantom* came to rest about 5000 feet from touchdown, less than 5 feet off centerline. The pilot was uninjured. Damage was limited to the centerline tank and the underside of the nose.

Investigation into the causes behind the failure of the nose gear to extend revealed that the bolt on the rod-end of the nose gear uplock actuator was not as specified by MIMs. The bolt installed was of a lower tensile/shear strength than that specified and presumably was overstressed when torqued as prescribed for the stronger bolt. Installation of this bogus bolt and/or possible overstress caused its eventual failure and subsequently the rod fork. This caused the NLG to remain up and locked, with landing damage an unavoidable consequence.

The complete maintenance history of the aircraft was closely studied in an attempt to determine when the unauthorized bolt was installed. Since acceptance of the aircraft from PAR about 9 months earlier, the squadron had not performed maintenance in the area of the NLG actuator. Normally, the PAR process does not require a check on this actuator (other than performing a drop check and fixing obvious hydraulic leaks), neither do organizational maintenance inspection procedures. Therefore, it is believed that no work on the actuator was performed subsequent to its installation during PAR almost 4 years earlier following incorporation of AFC 212. This AFC necessitated the removal of the NLG actuator which was labeled as having been overhauled at NARF. It took almost four years for this maintenance error to out but eventually the chickens came home to roost – with costly results.

The commanding officer commented:

"Once again we are reminded of the importance of proper aircraft maintenance procedures. It is imperative that all aircraft maintenance personnel ensure use of nuts, bolts, cotter keys, etc., which meet the required specifications when replacing any aircraft part and that quality assurance/control personnel verify such procedures."

Makes sense!

An Ill

A TA-4J *Skyhawk* departed on an instrument training flight. The instructor pilot was well-qualified in the TA-4J, but this was the first flight in an A-4 for the pilot under instruction.

Approximately 45 minutes after takeoff, the aircraft crashed into a mountain 400 feet below the ridge line at an elevation of 8000 feet (see photo). Both pilots were fatally injured.

The syllabus called for the student to perform a hooded practice penetration followed by a simulated GCA and missed approach. The simulated ground controlled approach was to be flown with the instructor pilot acting as controller. Assuming a normal sequence of maneuvers, the penetration/GCA/missed approach would have been in progress 45-50 minutes after takeoff.

Post-accident investigation revealed that at the time of the accident the flaps were down and the main gear was retracted. However, the nose gear was in the unlocked position, indicating that it was not fully retracted but transient at impact. This suggests the pilot(s) may have been executing a practice missed approach.

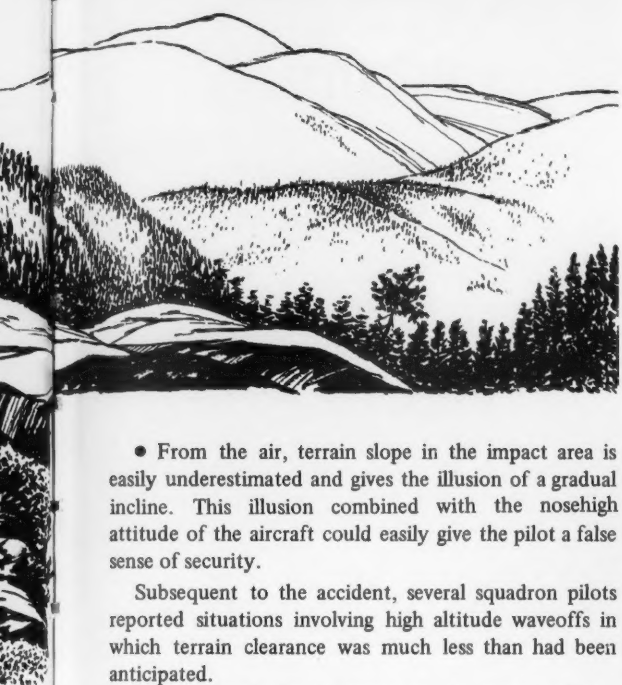
Prior to this accident, the squadron had conducted local basic instrument training flights off airways, over flat, low terrain. However, recent lowering of the PCA (positive control area) and recent requirements to operate as often as possible under positive control, caused a shift in the training area. Accordingly, the flight was being conducted over mountainous terrain in airspace set aside for that purpose.

Within the training area pilots maintained VFR but transited to and from the area under positive control. Elevations in the mountainous area reached 13,000 feet MSL with the average elevation near 8000 feet MSL. Missed approaches and waveoffs, which had been executed at 3000 feet, now had to be executed at much higher altitudes.

Flight along the same flight path approximating the conditions that existed on the fatal flight revealed the following:

- To maintain 170 KIAS in straight and level flight at 8000 feet MSL, gear and flaps down, required 97 percent engine RPM.
- The waveoff characteristics of the A-4 at this altitude and gross weight are extremely poor. While in a constant 700 fpm rate of descent during a practice GCA, a waveoff was initiated. To arrest the rate of descent and climb 500 feet required 36 seconds.

An Illusion of Safety



• From the air, terrain slope in the impact area is easily underestimated and gives the illusion of a gradual incline. This illusion combined with the nosehigh attitude of the aircraft could easily give the pilot a false sense of security.

Subsequent to the accident, several squadron pilots reported situations involving high altitude waveoffs in which terrain clearance was much less than had been anticipated.

This suggests the following as the most probable cause of the accident:

• The pilot under instruction (rear seat) was under the hood and was performing a practice penetration/GCA/missed approach. The illusion of gently rising terrain, as opposed to the actual steeply rising terrain, may have lulled the instructor pilot into a false belief that the ridge could be easily cleared. This false sense of security was possibly reinforced by the nosehigh attitude of the aircraft during the missed approach. In addition, and perhaps most important, the instructor pilot may have seriously overestimated the climb performance of the aircraft under existing conditions. In the past, most practice missed approaches had been performed at 3000 feet MSL where waveoff characteristics of the TA-4J are significantly greater than those at 8000 feet.

Further, the instructor pilot may have been fatigued and suffering from a minor illness. The day before the accident, he was the squadron duty officer. He retired well after midnight and arose early (0700). Equally important, the night preceding the accident, he phoned his wife and complained of being tired and feeling ill. However, the day of the accident, he told his wife he was not ill but tired.

In any case, the possibility existed that these factors decreased his alertness to the point where he failed to recognize a hazardous situation before it was too late.

It should be noted that it was squadron policy not to fly a pilot the day after standing squadron duty. However, this pilot had specifically requested to be put on the flight schedule.

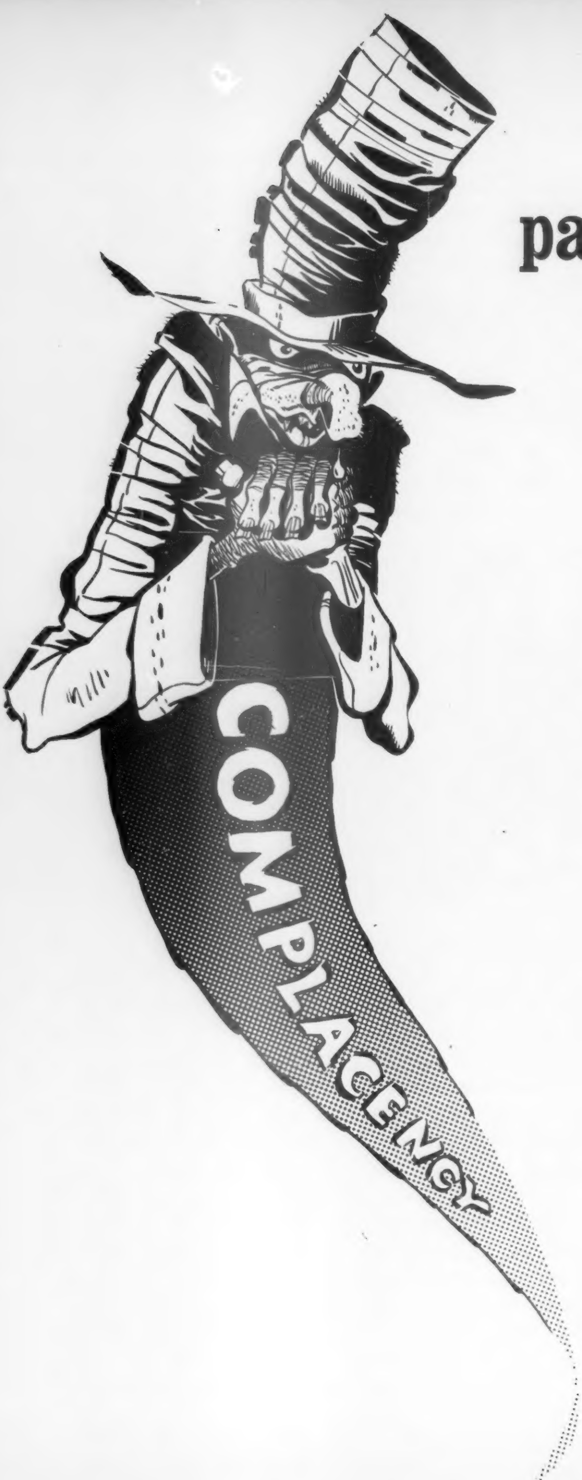
One recommendation is obvious. Pilots should guard against flying, and supervisors should guard against letting them fly, when ill or overtired. A second recommendation is valid, but less obvious. Whenever a change in the operating environment occurs, all concerned should be quick to assess its probable impact on current operations.

Same song, umpteenth verse.

Its easy to sit here and criticize pilots and those responsible for supervising flight schedules in the light of an accident possibly caused by pilot fatigue. But apart from our "desk jock" existence in the nonsquadron world – in the **real world** *pilots* **do** *fly when they're tired and supervisors* **do** *let them. If all pilots were cut from the schedule automatically because they looked or acted tired, how would a squadron ever complete its required sorties?*

Such decisions as to fly or not to fly are very personal. The individual is the only one qualified to assess his particular situation. A pilot knows when he's merely pooped from the early morning go or bone-tired beat because of not enough sleep and too many high G pullouts on the first hop. Let's face it, sucking 100 percent oxygen during taxi and climbout is not the magic rejuvenator it's touted to be.

It all boils down to the pilot, RIO, or BN having enough guts to tell the SDO, or Schedules, or Ops, "Goddammit, I'm just not up to flying today." – Ed.



'Is this the party to whom I am speaking?'

WHEN things are going great – BEWARE!! This is when "old man" complacency can step in and, with one wallop, ruin the day for lots of folks.

Here's what happened to a carrier-based helicopter detachment doing business in the Gulf of Tonkin. The det had been mishap-free throughout its many months of deployment. Evidently, this led to a false sense of security; in sauntered the "old man" and ZAP. Now on with the tale.

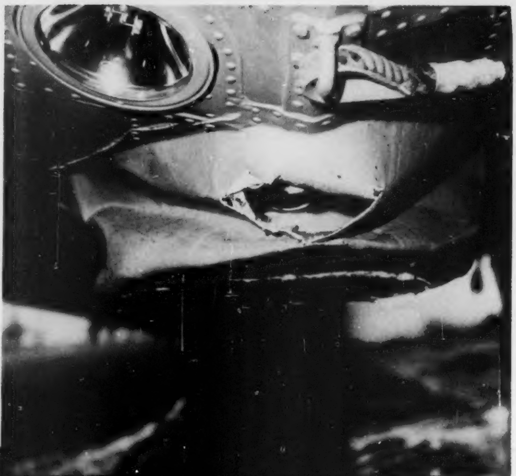
An SH-3 with a crew of four (pilot, copilot, AE2, and ADJ3) launched from the carrier for a flight to a DLG. Their mission was to provide standby SAR for fleet ops.

The DLG was sighted, and during the approach the pilots completed the NATOPS landing checklist. The gear was lowered, and as it was extending the crew heard a loud clunking noise (*Hello*). In addition to the noise, things were happening in the cockpit. The utility hydraulic pressure needle was jumping around like a cat on a hot tin roof, and the landing gear position indicators looked like a Las Vegas slot machine as they rapidly cycled from down and locked to "barber pole." Although the landing gear was down and locked, the light in the handle was flashing like a neon sign on the "Ginza."

The pilot decided a precautionary landing on the DLG was in order. After landing, the AE2 inserted the gear pins and the aircraft was shut down. The crew inspected the landing gear system but no discrepancies were found.

The pilot, a designated maintenance test pilot, decided to troubleshoot the clunking noise on deck with gear pins in.

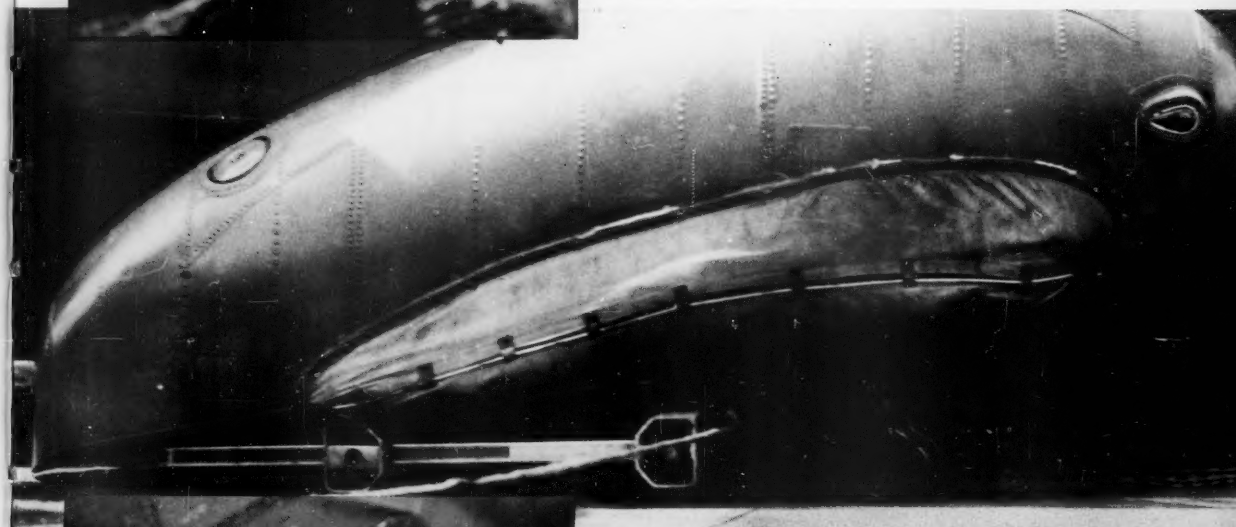
Initial turnup of the No. 1 engine at 104 percent N_f produced no effect. However, when the No. 1 generator was put on the line, the clunking returned (*Hello! Hello!*). Recycling the generator to OFF eliminated the clunking, and the gear indicators went from unsafe to down and locked. When the No. 2 generator was cycled, no discrepancy was noted.



Since the pilot was concerned about the clunking noise with the No. 1 generator ON, he elected to abort the mission and return to the carrier using the No. 2 generator.

He requested an escort helo enroute. This was provided, and both helos arrived at the carrier and made uneventful landings.

Before shutdown, the pilot demonstrated the clunking (*Hello, anybody home?*) to two detachment maintenance troubleshooters. After shutdown, he discussed the problem in detail with them. Unfortunately, these were the only maintenance personnel made aware of the gear indicators' fluctuation problem. In his yellow sheet writeup the pilot simply stated, "when No. 1 gen was turned ON, loud clunking noise from No. 1 gen."



Later that evening, the pilot started the No. 1 engine for a maintenance turn. Several inexperienced night check troubleshooters conducted many checks, but the source of the clunking sound (*Answer, DAMMIT!*) could not be located. The only thing found was that each landing gear actuator had a jerking motion which would cease when the landing gear circuit breaker was pulled.

Perplexity was the name of the game in night check about now. After installing a new voltage regulator and supervisory panel, the aircraft was shut down. The crew got together for a powwow, but no one thought to break out the MIM for reference. No solutions were reached that night. Next morning, night check made a casual PDL notation to the day crew.

That same morning, an electrician changed the transformer-rectifiers. Another engine turnup was made,

but the clunking noise (*HEY THERE!!!*) was still there. However, the landing gear indicators did not fluctuate.

Two days later, the det maintenance officer turned up the SH-3. No clunking sound or indicator fluctuations occurred. The No. 1 and No. 2 generators were cycled about 20 times. All systems were normal. The general consensus of maintenance personnel was that the malfunction had been caused by water in the cannon plug at the utility hydraulic manifold, which had since dried out. During the past few days it had rained constantly, and the helo det had been having a lot of problems with water in electrical components. The aircraft was placed UP.

Next day the same crew which had experienced the original clunking was assigned to fly the *Sea King* on another SAR standby mission. A preflight was conducted and the crew manned their aircraft.

The No. 1 engine was started using the NATOPS checklist. At the point where the pilot was to advance the speed selector to 104 percent N_f and before the generators were to be turned on, an ABH3, acting as fireguard, removed the port main landing gear pin and walked around to position his fire bottle next to the starboard sponson. He then removed the starboard pin and showed both pins to the pilot. He gave the pins to the second aircrewman and walked forward to his station near the starboard bow of the aircraft.

The pilot then turned on the No. 1 generator and again heard the clunking sound (*.$%+*!& . . . .*) and saw erratic gear indications. He cycled the No. 1 generator and still got the same reaction. One of his crewmen asked if he wanted the gear pins reinserted. He replied in the affirmative. Before this could be done, however, the MLG collapsed (*Well, finally! I'd like to report . . . oops, too late . . .*) and the aircraft settled onto its nose compartment. The engine was secured.

There were several cause factors involved in this mishap. Let's take a look at them:

- Material failure of the MLG scissors switch led to the actual collapse of the gear.

- The pilot was a contributing cause factor in two ways. He failed to write up a complete gripe on the yellow sheet, and he deviated from NATOPS by allowing the gear locking pins to be removed out of sequence. Somehow this had become standard practice in the detachment, and no one had taken action to stop it.

- Maintenance supervisory personnel gave no thought to a possible MLG failure. After the pilot had reported the clunking noise to the troubleshooters, three engine turnups were made prior to the mishap. During two of them, the same symptoms were evident. On the third turnup, the clunking and gear indicator fluctuations disappeared, and the aircraft was put in an UP status. No gear dropcheck was made.

The investigation brought to the surface a number of shoddy practices being used by the detachment:

- The ABH3 fireguard was TAD from the carrier. He had neither formal training nor adequate briefing concerning detachment operations. He did what he had seen others do. That's why he pulled the gear lock pins without being directed to by the pilot.

- Maintenance passdown procedures were loose and informal. No record was kept for referral purposes between work shifts.

- Detachment training was insufficient. Several inadequately trained troubleshooters were permitted to troubleshoot the aircraft.

- Adherence to unsafe practices. Deviation from NATOPS and shortcutting were being tolerated by pilots and maintenance supervisory personnel.

"Old man" complacency, astride his black cloud, was hovering over this outfit. It's too bad an expensive mishap had to occur before the det could be jarred back to reality. As we said earlier – BEWARE!!

Bang!

A LOUD explosion occurred in the cabin of an SH-3 approximately 25 minutes after the heater had been turned on. The pilot secured the heater and blower and ordered a crewman to investigate. The crewman found a Mae West resting against a heater outlet on the right side of the sonar console. The CO_2 bottle had exploded. The lifejacket had been placed on top of the sonar console during a recent extended cross-country. No one in the aircraft noticed that it had fallen off and was blocking the hot air outlet.

(See APPROACH, October 1971, page 34 for additional information concerning failure of CO_2 cylinders.)

It Really Did Happen

From the Files – APPROACH, Nov. 1955

"HE nearly put one into the spud locker!" is a traditional comment of naval aviation which refers to a low carrier pass that puts the plane in danger of hitting the stern of the ship. The odds against successful accomplishment of this feat are astronomical, and there has been no report of a pilot surviving a trip through the fantail. But there's always a first time . . .

Following a night flight, the pilot of an F2H-3 *Banshee* began a carrier approach which was normal until he neared the groove. At this time the LSO observed an uncorrected rate of descent which necessitated a waveoff. Although the pilot added power, the plane did not respond in time to clear.

The airplane crashed into the starboard side of the fantail, just below the ramp, and exploded on impact. The right wing and aft fuselage broke away and fell into the sea, carrying the fire away.

The pilot was able to scramble, unassisted, from the cockpit section which was wedged in the fantail. He sustained no serious injuries. The effective use of shoulder harness, safety belt, protective helmet and oxygen mask undoubtedly enabled the pilot to survive this most unusual accident.

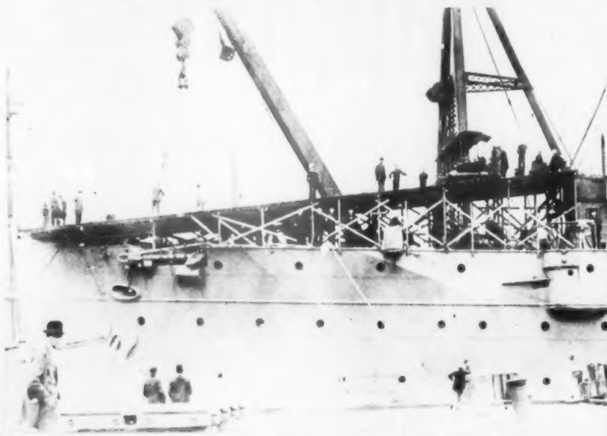
. . . And the F2H pilot actually walked away!

Captain Washington Irving Chambers

The first Navy aircraft purchased was a Wright land-plane, converted to a seaplane by installing a specially designed float. It is shown here in Baltimore Harbor after its conversion in 1911.

The Pioneer Years

Part One, 1910 – 1913

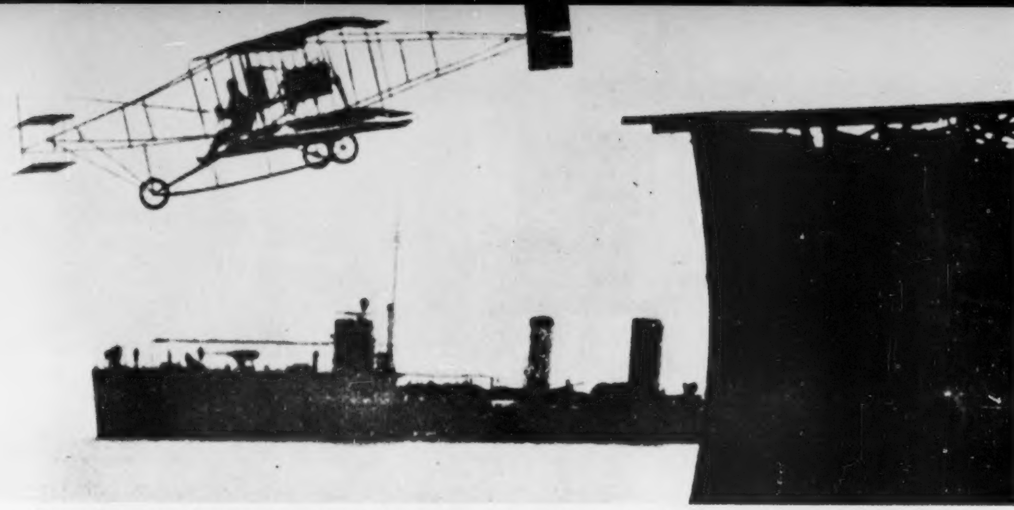


The Curtiss 'aeroplane' was assembled on the temporary platform onboard the USS Birmingham.

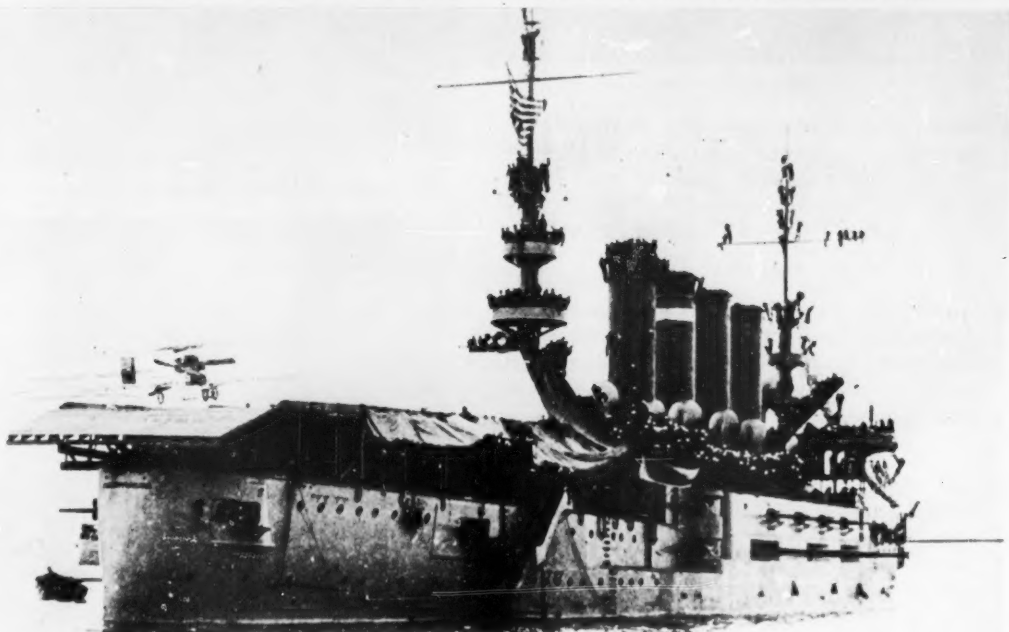
DURING the years 1910 – 1916, naval aviation was pioneered by a group of daring and dedicated men. There was no book to go by, so through trial and error, they wrote one.

APPROACH will take you back to those formative years by presenting some of the early naval aviation highlights in capsule form. We found them mighty interesting and hope you will too.

The pioneers at Guantanamo in 1913. From left to right (standing) B. L. Smith, P.N.L. Bellinger, A.A. Cunningham, W.P. Billingsley, (seated) V. D. Herbster and G. deC. Chevalier.



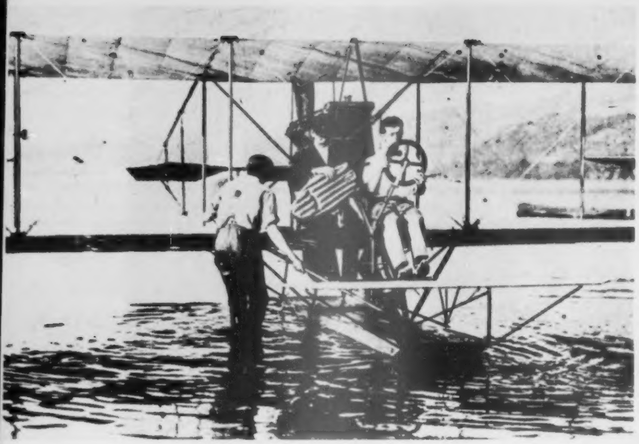
Eugene Ely leaving the USS Birmingham at Hampton Roads in the first takeoff from any ship, November 14, 1910.



Flying a Curtiss biplane, Eugene Ely comes aboard the USS Pennsylvania on January 18, 1911, thus making the first shipboard landing.

The sand bags that halt Ely's plane become the first arresting gear.

Continued



LT Ellyson, Naval Aviator No. 1, gives CAPT Chambers a flight in the Navy's A-1.

1910

September

26 Captain W. I. Chambers, Assistant to the Aide for Material, was designated as the officer to whom all correspondence on aviation should be referred. This is the first recorded reference to a provision for aviation in Navy Department organization.

November

14 Eugene Ely, a civilian pilot, took off in a 50-hp Curtiss plane from a wooden platform built on the bow of the USS BIRMINGHAM. The ship was at anchor in Hampton Roads. Ely landed safely on Willoughby Spit.

December

23 The first naval officer to undergo flight training, LT T. G. Ellyson, was ordered to report to the Glenn Curtiss Aviation Camp at North Island, San Diego.

1911

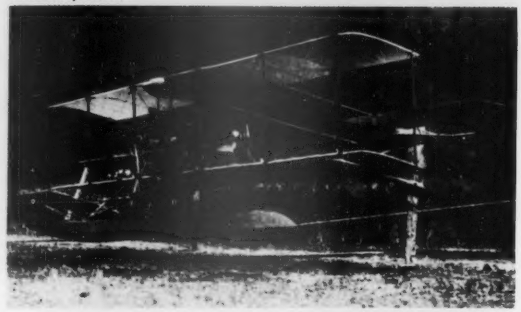
January

18 At 1101, Eugene Ely, flying a Curtiss pusher, landed on a specially built platform aboard the armored cruiser USS PENNSYLVANIA at anchor in San Francisco Bay. At 1158 he launched from the cruiser and returned to Selfridge Field, San Francisco, completing the earliest demonstration of the adaptability of aircraft to shipboard operations.

March

4 The first funds for naval aviation were appropriated, providing $25,000 to the Bureau of Navigation for "experimental work in the development of aviation for naval purposes."

Hoisting Curtiss plane aboard the USS Pennsylvania, February 1911.



A-1, the first Navy plane, is prepared for launch from wire.

Naval aviators Nos. 1 and 3, Ellyson (right) and Towers.

May

8 Captain W. I. Chambers prepared requisitions for two Curtiss biplanes. One, the *Triad,* was to be equipped for land or water operation, have a speed of at least 45 mph, with provisions for carrying a passenger alongside the pilot, and with controls that could be operated by either the pilot or passenger. This machine later became the Navy's first airplane, the A-1. *Because this was the date the Navy decided on a specific aircraft purchase, 8 May has been officially proclaimed the birthday of naval aviation.*

First Navy aircraft, the A-1 *Triad* Hydroaeroplane, taxiing on Lake Keuka, Hammondsport, New York.

Single seat Curtiss trainer, Circa 1911, similar to the Navy A-2.

December 1912 saw the first successful launching of a flying boat at the Washington Navy Yard.

July

1 Glenn Curtiss was at the controls for the first flight of the Navy's A-1. He took off from and landed on Lake Keuka near Hammondsport, N. Y. The first official Navy hop lasted 5 minutes and reached an altitude of 25 feet.

3 Lieutenant Ellyson flew the A-1 from Keuka to Hammondsport, N. Y., on the first night flight by a naval aviator. He landed successfully on the water without the aid of lights.

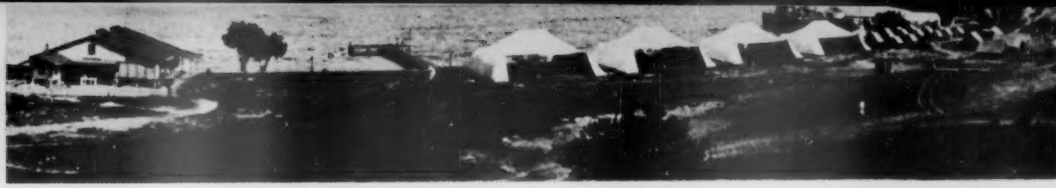
6 Captain Chambers was ordered to temporary duty at the Naval Academy in connection with the establishment of an aviation experimental station located on Greenbury Point. This was to be the first base for naval aviation.

12 Amphibious features of the *Triad* were demonstrated by Glenn Curtiss. He took off from land in the A-1, lifted the wheels, then made a water landing.

September

7 A memorable experiment in the Navy's search for a shipboard launching device was completed at Hammondsport, N. Y., when LT Ellyson made a successful takeoff from an inclined wire rigged from the beach down to the water.

16 Plans to purchase flight clothing were described in a letter from LT Ellyson (he hoped to get the department to pay for them later). Requirements were previously outlined as a light helmet, with detachable goggles or a visor, with covering for the ears, yet holes so that the engine could be heard; a



Base for first aviation operations with fleet established at Fisherman's Point, Guantanamo Bay, Cuba, January 1913.

leather coat lined with wool or fur; leather trousers; high rubber galoshes and gauntlets; and a life preserver of some type.

October

17 Searching for improved powerplants, CAPT Chambers, in a letter to Curtiss, discussed heavy oil (diesel) engines and turbine engines similar in principle to those, that some 30 years later, would make jet propulsion practical. Chambers wrote, "In my opinion, this turbine is the surest step of all, and the aeroplane manufacturer who gets in with it first is going to do wonders."

December

20 Experiments with airborne wireless transmission were conducted at Annapolis by ENS C. H. Maddox in the A-1 piloted by LT J. D. Towers (Naval Aviator No. 3).

29 The aviators at Annapolis were ordered to transfer with their equipment to North Island, San Diego, to set up an aviation camp on land donated for that purpose by Glenn Curtiss.

1912

May

22 First Lieutenant Alfred E. Cunningham, USMC, was the first Marine Corps officer assigned to flight instruction. He later became Naval Aviator No. 5.

July

31 The Navy's first attempt to launch an airplane by catapult was made at Annapolis by LT Ellyson in the A-1. The aircraft, not being secured to the cat, reared at about midstroke, was caught by a crosswind and thrown into the water. The pilot was not injured.

October

8 Physical requirements for prospective naval aviators were first defined in Bureau of Medicine and Surgery Circular Letter 125221.

November

12 The Navy's first successful launching of an airplane by catapult was made at the Washington Navy Yard with LT Ellyson at the controls of an A-3. The following month a flying boat was successfully launched from the same catapult.

1913

January

6 The entire aviation element of the Navy arrived at Guantanamo Bay, Cuba, and set up an aviation camp on Fisherman's Point for naval air's first operations with the Fleet. Scouting missions and exercises in spotting mines and submerged submarines were conducted in support of fleet maneuvers. This was done to demonstrate operational capabilities of aircraft and to stimulate interest in aviation among fleet personnel. More than a hundred such personnel were taken up for flights during the 8 week deployment.

March

4 The Naval Appropriations Act for fiscal year 1914 provided an increase of 35 percent in pay and allowances for officers detailed to duty as flyers of heavier-than-air craft. The number was limited to 30 and no officer could be above the rank of LCDR (Major in the Marine Corps).

June

20 Ensign W. D. Billingsley (Naval Aviator No. 9), piloting the B-2 at 1600 feet over the water near Annapolis, was thrown from the plane and fell to his death. He was the first fatality of naval aviation.

October

7 The Secretary of the Navy appointed a board of officers, with CAPT Chambers as senior member, to draw up "a comprehensive plan for the organization of a Naval Aeronautic Service." The board's recommendations included the establishment of an Aeronautic Center at Pensacola; establishment of a central aviation office under the Secretary; assignment of a training ship; assignment of one aircraft to every major combatant ship; and the expenditure of $1,297,000 to implement the program.

December

17 Captain M. L. Bristol relieved CAPT Chambers as officer in charge of aviation.

The years 1914 – 1916 will be covered in the next issue of APPROACH. – Ed.

Safety BEFORE the Fact

A LIST of accident producing factors taken from mishap reports clearly indicates the need for repetitive safety education.

This list, although not all inclusive, might best be used as a checklist against similar malpractice in your unit. Have you observed any personnel making the same errors?

Pilot

Eliminating preflights or conducting cursory ones.
Omitting checklists or attempting to cover checklists alone (not applicable to single seaters).
Starting powerplants out of sequence or not following start procedures.
Engaging rotors with the collective out of the 3-degree detent.
Starting to taxi before the lineman signals clear or before tiedowns and pins are sighted.
Using excess power moving out of the chocks.
Conducting power checks or runups without clearing the area astern.
Conducting ground operations at night, in close areas, without taxi lights.
Spreading wings in cramped areas.
Operating on the ground at strange airports without specific instructions.
Taxiing in close quarters without direction when there is doubt about clearance.

Line Operations

Plugging in power and exercising a control without observing all clear.
Leaning into a cockpit from the outside of the aircraft and being crushed by the canopy.
Failing to remove all tiedowns or pins before clearing the pilot to taxi.
Failing to observe a clear taxi zone before releasing the pilot to taxi.
Permitting objects (chocks, fire bottles, etc.) to remain adrift around the line.
Parking an aircraft improperly in any manner off the spot.
Using improper hand signals.
Walking in the danger zone when props are turning or jets operating.

Support Personnel

Operating GSE when not qualified or GSE is not in proper operating condition.
Parking GSE with engine running and vehicle unattended.
Moving GSE away from aircraft before detaching leads.
Towing aircraft with insufficient helpers or equipment.
Using any vehicle as a workstand.
Failing to observe standard safety precautions such as safety rails on workstands.
Exceeding speed limits.
Approaching or leaving an aircraft in vehicles at an improper angle.
Filling avgas tanks with JP or vice versa.

Take a good look at your own unit. See if you can *put safety before the fact.* ◄

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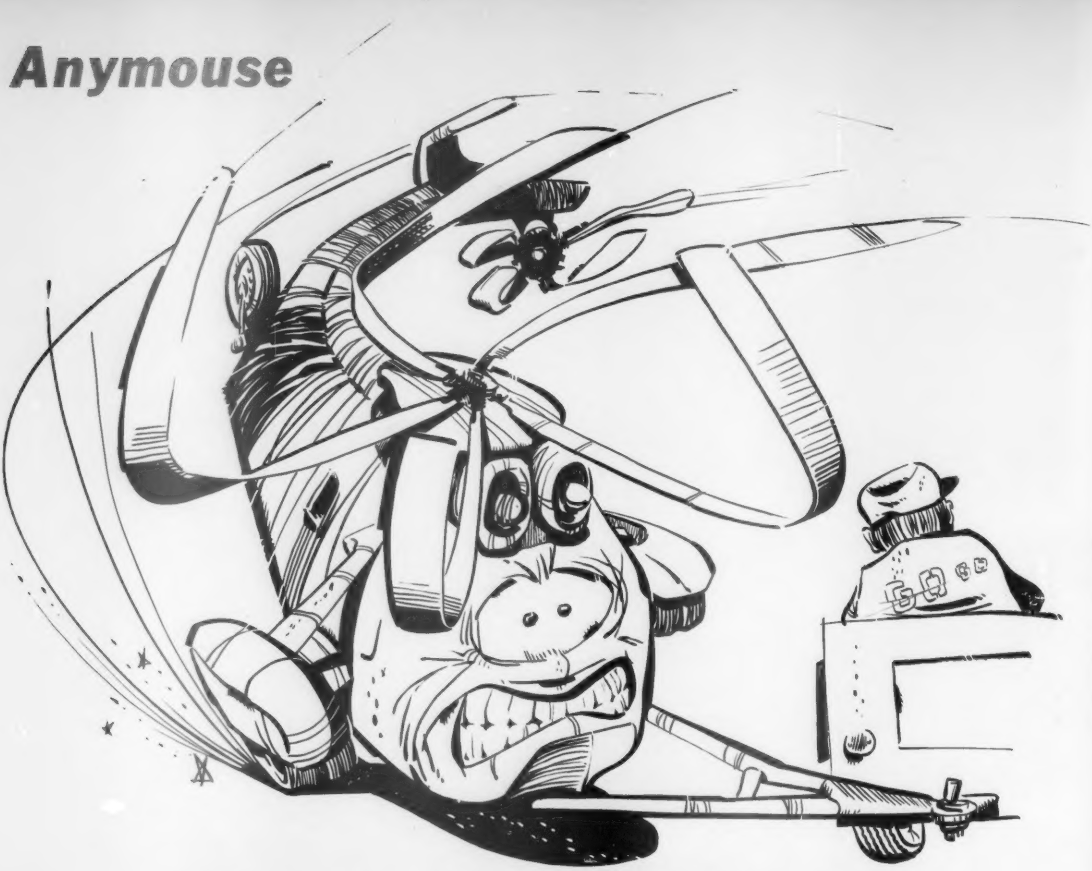
Anymouse



Whip Crackin' Helo Buster

The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. These reports need not be signed. Self-mailing forms for writing Anymouse Reports are available in readyrooms and line shacks. All reports are considered for appropriate action.

REPORT AN INCIDENT
PREVENT AN ACCIDENT

DURING USS Flattop's recent transit from CONUS to WESTPAC, portions of her air wing, including the helicopter, were standing a 5-minute BARCAP alert. Shortly after noon an aircraft target was picked up on ship's radar. The BARCAP was launched. The bogie was identified as an airliner and the BARCAP returned. After landing, the helicopter crew discovered a hydraulic leak in the flight control servos and downed the bird. At the same time relief pilots preflighted and strapped in the backup helo which was stowed behind the island.

It was at this point a young sailor decided to swim to CONUS. He was seen diving off the fantail. An immediate "man overboard" was sounded. The helo pilots started through the prestart checklist while the aircrewmen rigged the rescue hoist and made a quick inventory of the rescue equipment.

The aircraft handlers, in their haste to respot the helicopter, pulled chocks and tiedowns and started towing the helicopter without notifying the pilots. A quick-thinking pilot released the brakes and tail wheel locking pin before the helo was damaged. A wild ride ensued during which the helicopter was towed towards the bow at 15-20 mph through a maze of aircraft and tractors.

The ship commenced a hard starboard turn and heeled to port

about 10 degrees. The tractor driver, in his haste to turn the helicopter into the relative wind, reversed directions and literally cracked the whip with the helo. The severe strain on the tail wheel tore the tire from its rim cutting off the grounding wire. The HAC was informed of the damage but decided to launch anyway. (The only other usable helicopter was buried in the hangar bay.)

Difficulty was encountered in applying external power but eventually it was plugged in. After a normal start and engagement, a fairly quick rescue was made.

This should have been a routine rescue. Both aircraft handlers and helicopter detachment crew must share the blame for a near accident. The aircraft handlers should have respotted the first helo as soon as it went down so the standby helicopter could be spotted on the bow. The handlers, in their zeal, threw all caution to the wind and nearly turned a routine respot into a ground accident. The pilot riding the brakes should have used the brakes to slow excessive towing speed. Had the helicopter overturned, several lives could have been lost, including the life of the man in the water.

Iratemouse

Right on!

Max Range . . . Gasp!

AS LT Hasty left AFB Alpha, enroute to AFB Bravo, he had no idea how poorly he had planned his fuel. The distance was well within the range of the A-7A, but he was carrying a MER and a TER and had over 100 knots of headwind. These facts never penetrated his little brain.

The flight proceeded without difficulty and the young LT even displayed good headwork by descending a bit in search of more favorable winds. However, to his dismay, even at FL 180 he had 80-90 knots of wind on the nose.

Possibly the poorest bit of headwork displayed on this memorable day was when LT Hasty bypassed a perfectly good AFB between Alpha and Bravo. Nearing Bravo, the weather began to deteriorate appreciably. The last 1½ hours of the flight were IFR, and the weather at Bravo was 600-900 feet overcast with pouring rain.

The low fuel light came on approximately 90 miles out. Center was busy with other flights and LT Hasty couldn't get a word in edgewise. He *began to worry and his voice changed.* He switched to approach control and began squeaking. He reported position and state (about 900 lbs at that time) and informed them that, while he was not declaring an emergency, he "wanted priority!!!"

Approach control responded by vectoring him directly toward the base and turning him onto final about 2 miles from the end of the runway. The scared LT landed in a driving rainstorm into what looked like 6 feet of water on the runway and rolled out *very carefully.* It was then he noticed all the pretty red fire trucks with flashing red lights. They were not needed, but were standing by in case of a blown tire. LT Hasty had advised them that on extremely wet runways this was a possibility.

LT Hasty taxied to the transient line and shut down with 600 lbs of fuel remaining. Close? You know it!

An experienced pilot should know better. This is the kind of close call you could expect of a nugget, not a 1400-hour combat veteran. LT Hasty learned a good lesson, the *hard way.* Henceforth, when down to 2000 lbs of fuel, this cautious aviator will be in the landing pattern. He also suggests that the mental anguish is not worth the time saved by passing up a good fuel stop. Others have flamed out on or short of runways. LT Hasty says, "Take it from me, there is no excuse for poor flight planning or for trying to stretch your range beyond reasonable limits."

Wisermouse

Wisermouse has laid it on you. All you gents better be pickin' up on it. Know what I mean?

Automatic Altitude Reporting

THE NAVY'S investment in the AIMS* program is now beginning to return dividends in the form of increased safety and operational capability. Aircraft equipped with the new 4096 code/Mode transponders are able to take full advantage of the automated air traffic control equipment being installed nationwide.

By 1975, all enroute air route traffic control centers and 61 selected terminal areas in CONUS will be automated. Also, during this time frame, all Navy RATCCs and Air Force RAPCONs not served by FAA automated equipment will be equipped with TPX-42 direct altitude and identity readout equipment. The advantages that will be introduced by modernization of the NAS (National Airspace System) are numerous, but some of the most important will come from automatic altitude reporting.

New AIMS altimeters have altitude encoders that enable the aircraft transponder to continuously transmit barometric altitude information to the ground. This altitude information is displayed on the air traffic controller's scope in hundreds of feet. These altitudes are automatically corrected to local altimeter settings for aircraft below 18,000 feet. Although the pilot is unable to monitor the accuracy of the information being transmitted, it is designed to be accurate within 125 feet.

*** A** – Air traffic control radar system
I – Identification – friend or foe
M – Military identification
S – System

Altitude readouts greatly enhance the controller's ability to avoid possible conflicts and use the available airspace more efficiently. Present requirements for pilots to report altitude orally while under positive control will not disappear overnight, however. To allow controllers and pilots to gain confidence in the new equipment, a "verification" process will still be required for some time.

Verification of Mode C readouts occur when the controller compares his scope reading with the altitude reported by the pilot on initial contact. A readout can also be verified for aircraft in level flight when it corresponds within 300 feet of assigned altitude. Verification for departing aircraft can be accomplished by comparing the automatic altitude report with the field elevation, and continuous interrogation is available from the airport surface until radar identity is subsequently established.

Controllers are prohibited from using unverified Mode C information or that which has an error of 300 feet or more. If your transponder is putting out inaccurate readings, you may hear, "Stop altitude squawk, altitude difference (number) feet." *In this case the Mode C altitude portion of your transponder should be turned off and griped on the "yellow sheet."*

Because the allowable error for Mode C information is relatively low, it is important that you report your altitude to ground stations precisely. *If you are descending through 7500 feet, for example, call, "Passing seven point five," rather than the last whole thousand. Any error you throw into the system might make it appear that your Mode C transponder is in error.*

Knowing his altitude is being displayed on a controller's scope will probably cause a pilot to maintain an assigned altitude a little closer. Very few of us like to appear sloppy in our airmanship, even to an unseen stranger on the ground. *Present plans call for an altitude alarm to be displayed next to an aircraft's symbol on enroute radar displays when assigned and reported altitude differ by 300 feet.*

Automatic altitude reporting will have applications over and above the decrease in air to ground radio communications. An example is the automatic VFR advisory service being tested by the FAA at Knoxville, Tenn. A ground radar tracks beacon equipped targets within 60 miles, and computers predict possible collisions based on computed ground track and Mode C altitude information. A computer run voice synthesizer then transmits traffic advisories to participating aircraft on a common frequency.

Use of Mode C altitude information could play an important role in the development of a ground based collision avoidance system for controlled airspace. As Mode C becomes more prevalent, its potential for increasing safety during all phases of flight should be more fully exploited.

Transponder Tips

WHEN a four digit code is assigned by air traffic control, a few precautions are called for in dialing it in . . . Don't change codes until you are sure you know what the new one is. If you set in the first three digits and ask approach control for a repeat on the last digit, you would be identified as a different aircraft by automated equipment on the ground. *Make sure you know what the new code is, then set it up quickly.*

. . . . When changing codes, be careful that you don't pause temporarily with 77, 76, or 31 as the first two digits. *This could activate an alarm in a control facility for an emergency (77), lost communication (76), or a hijacking (31)!* . . . . Make sure your transponder code is set and the equipment is turned on prior to takeoff roll. This expedites radar contact for departure control.

. . . . Go to STANDBY or OFF as soon as practicable after landing to eliminate unnecessary targets on the radar.

F-4 Trend Analysis

THE FY-72 accident/fatality rate has exhibited an overall decrease in comparison with the same period in FY-71. However, an examination of F-4 mishap causal factors thus far in FY-72 has revealed a significant imbalance between the pilot/controlling personnel factors and those of maintenance/material origin. Maintenance/material caused accidents have decreased from 22 to 5 while pilot/controller caused accidents have remained constant at 14.

Pilot/controller factor mishaps are centered in two separate but related areas:

• Hard CVA landings have been responsible for five such mishaps to date this FY versus one in FY-71. The following circumstances existed with varying degree in all five accidents:

(1) Aircrew failed to notify LSO that cockpit/flight conditions were other than optimum, i.e., lack of lighting, yaw stab inoperative, etc. This deprives the LSO of inputs that influence his judgment when critical limits are approached or exceeded in the approach.

(2) In-close corrections was a common factor to all, as was marginal pilot performance. The pilots in four mishaps had previously displayed marginal performance trends, which are capsulated as follows:

(a) Rough glide slope control with a tendency to drop nose in-close.

(b) Slightly cocked up with increased rate of descent at ramp.

(c) Below average in landing phase, but not considered dangerous.

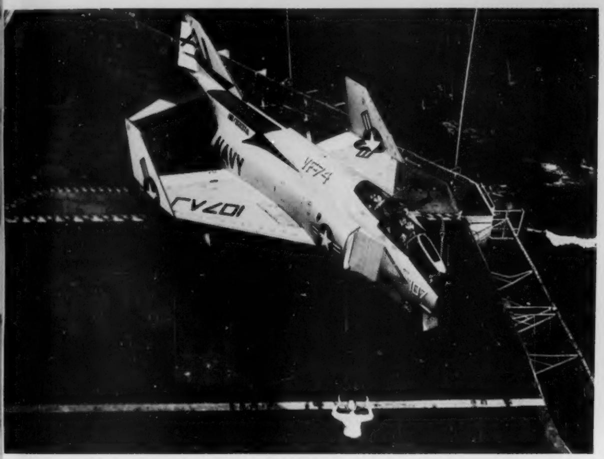
(d) Late lineup, dropped nose at ramp. Tendency to drop nose at ramp occurred during first line period. Pilot was counseled. Mishap occurred during second line period.

(e) Dropped nose to land. Average landing performance with tendency to go high/fast within last 30 days.

• Controlling personnel. Aircraft/ship communications associated mishaps during launch/bolter phases have resulted in three mishaps versus one in FY-71, and aircraft losses have increased to four versus one in FY-71.

(1) On one occasion, the aircraft was waved off due to a misinterpreted fuel/gross weight call. The pilot selected the VFR pattern, but due to UHF channel confusion, made the second approach without LSO communications, touching down in disregard of the waveoff lights. The F-4 boltered, settled off the angle, then appeared to be responding to CRT when the




crew ejected.

(2) In another recent mishap the aircraft made two recovery attempts with airspeed/flight control difficulties. On the third pass, in a shortened pattern, flying speed was not maintained. The aircraft impacted the water. The pilot failed to inform the LSO that additional mechanical difficulties had further degraded controllability to the point where existing airspeed was unacceptable for recovery.

One recent endorser's remarks are reprinted herein as they aptly express a successful recovery philosophy:

"Pilots are continually briefed on the necessity for flying optimum carrier approaches. It is fact, however, that all approaches are not optimum and in these cases the LSO/pilot must form a cohesive team which can safely 'save' some of the approaches or initiate waveoffs or bolters to prevent accidents.

"In this instance, it appears that both members of the team fell victim to 'get-aboard-itis' when more critical restraints by the pilot, a waveoff, or an LSO-induced bolter would have been preferable. All members of the air wing team are and will be continually reminded of the importance of adhering as closely as possible to optimum conditions both from a pilot and LSO standpoint; but, in certain cases, particularly at night, the bolter or waveoff must be accepted in lieu of possible aircraft damage."

With a view toward the high-risk months of summer, the following supplemental actions are recommended in order to reverse the present trend:

- *Insist that aircrews advise the LSO/controllers and receive acknowledgement when cockpit/flight conditions are other than optimum.*
- *Evaluate pilot landing performance with strict objectivity and insist on demonstrated improvement where necessary.*
- *Ascertain that corrective action, when applied, actually produces the desired effect.*
- *Review approach limitations with all LSOs/pilots/controllers as they relate to waveoffs/bolters/bingos.*
- *Review positive communications procedures between aircrews/LSOs/controllers and ensure these procedures are in effect and universally understood.*
- *Insist on absolute compliance with prescribed procedures.*

Adapted from NAVSAFECEN Flight Safety Advisory 8-72

Bronco Bustin'

A SECTION of OV-10A *Broncos* departed at night on an IFR flight from one air station to another several hundred miles away. Twenty-five miles from destination the flight was cleared for a TACAN penetration to 5000 feet.

Shortly after reporting "leaving 9000 feet," all communication with the flight was lost. It was later determined that the two planes had collided. Both crews successfully ejected over water and were picked up by fishermen several hours later.

The flight leader described the events leading up to the collision:

" . . . finally contacted approach control, received clearance for a TACAN approach, and was told to report passing the 200 degree radial for descent. I told them I was past the 200 degree radial, and (I believe it was at this time) they cleared me for a TACAN 1 approach and descent to 5000 feet. At that time I was at the initial approach fix and reported 'commencing approach, leaving 9000 feet.'

"I took control of the aircraft from my copilot and reduced power to about 800 lbs of torque. Realizing I hadn't put the condition levers up, I pushed them very slowly watching the temperatures. Everything was normal. We overshot the assigned radial due to the delay in getting clearance. I tracked back onto the radial and at approximately 20 miles passed 6000 feet. This was the last altitude I saw.

"The DME had unlocked, so I'm not sure of my exact distance from the station. About this time the aircraft nosed down and I felt less than one G. I didn't really rise out of the seat but my body got light. Then I heard a bang. The aircraft pitched up violently and rolled to the right. It continued in a hard right turn. I was being thrown around in the cockpit. I put the controls to neutral and tried left rudder with no effect. It felt as if the rudder pedals and control stick weren't doing anything, as if the control surfaces weren't there or were damaged, and my inputs useless.

"Coming around after the first turn, I saw my wingman's airplane. I thought it was on fire but now think I saw him eject. There were a lot of sparks and some were actually passing over our aircraft. I continued

turning to the right and into a tighter turn. As the nose went down I looked at the VGI. It was completely in the black telling me that the nose was straight down and we were still in a right turn. There wasn't anything I could do to regain control. I keyed the ICS and said, 'Get out, Jack,' and pulled the ejection handle."

The wingman saw things from a slightly different, but equally interesting, viewpoint. He stated:

"I knew we were overshooting the 179 degree radial and that it would take a left turn to get on the inbound of the approach requested by the flight leader. A rather abrupt left turn was made. I didn't have any trouble staying in position since I was still pretty far out when he leveled his wings and started to descend. I didn't hear what altitude we were cleared to. I heard him call, 'Leaving niner thousand' as cleared, but can't remember what altitude.

"Flight clearance had predicted some light turbulence in the area. I was in a very loose cruise position, so it didn't bother me. There was some turbulence just before we went into the clouds. At that time I moved in a little closer. Looking forward, I saw we had to penetrate a cloud layer of unknown thickness. My altitude seemed to be about 6000 feet.

"I can't really say how close I was at that point. I tucked in to a normal bearing for IFR parade position. I didn't really notice. I was looking at him expecting signals for level off, or whatever. We continued and I tucked in a little bit closer, to about 5 feet overlap and 5 feet stepdown. I was using him as my reference at all times because we were getting ready to go into the goo. We went through a few puffy clouds and came out. It was clear. Then we were back in again, apparently for a good while. I don't have any idea at what altitude this was. This is where it gets sketchy, because this is where it happened.

"I looked around and all of a sudden it was dark. I looked over at my left wing and it was on fire. It seemed that the leading edge was being peeled back with sparks flying from it. The outboard two-thirds of the wing was on fire. Needless to say I was somewhat startled. I moved the stick to the right and looked down at the lead aircraft. His aircraft was engulfed in flames and spewing. It looked like the 4th of July down there with pieces of metal flying everywhere. It must have been metal. It was pieces flying through the air on fire.

"I was so shook up by now that I don't really know what was going on. I saw the leader go into uncontrolled flight. There were more pieces of metal flying and yellow flames shooting out of his plane. I realized that he was in uncontrolled flight. The minute I saw my plane on fire, his plane on fire, and half my wing gone, I knew it was time to get out. It all happened instantaneously, and I wasn't about to mess with a wing that was half gone.

"Without thinking about another thing, I pulled back the stick, reached down between my legs, and pulled the handle. 'Bam!' I was gone. I guess I went into a state of shock. When I pulled up and started to eject, I remember looking at the instrument panel. Everything was on. All I could see was a big bunch of red.

"I don't know what warning lights were on. I saw a whole bunch of them. I don't believe the engine was on fire. At the time of ejection my aircraft was 15-30 degrees nose up, wings level. I estimate my airspeed to be 150-160 knots. There was nothing that indicated that I had made contact with the other aircraft, although I assumed that was what happened. I had the other aircraft in sight at all times and was able to see his wing and my wing throughout the entire sequence."

The cause of this accident was due to failure of the wingman to maintain proper formation position. Further, the pilot of the wing aircraft was lacking in night formation proficiency. As one endorser noted:

"Lack of proficiency in formation flying was a well-documented contributing factor in this midair collision. Selective scheduling or a more thorough briefing to encompass individual approaches in case of inclement weather would possibly have prevented this mishap."

'Look Ma, No Hands!'

By LT John C. Porter, USN
VF-114
and
LT N. R. Criss, II, USNR
VF-213

DURING a 1970-71 deployment aboard the USS KITTY HAWK, *Phantom* squadrons VF-213 and VF-114 became the first in the Pacific Fleet to gain extensive operational experience with the Data Link Automatic Carrier Landing System. The "Aardvarks" of VF-114 and the "Black Lions" of VF-213 flew over 500 fully automatic "hands-off" landings to touchdown during night and IFR conditions, in addition to many partially automatic or manual approaches utilizing the ACLS (Automatic Carrier Landing System). Utilization of the ACLS proved invaluable in improving the overall quality of carrier landings, and significantly increased the F-4 night boarding rate.

While only minor and easily correctable technical deficiencies were uncovered during this period, we *Phantom* crews did find that there was a definite art to using the system. With proper utilization, the system is a great help; however, there are some areas where you can get into trouble. Through experience, the crews were able to formulate the little "tricks" that allowed the ACLS to perform in an optimum manner. Though these procedures varied slightly from crew to crew, a number of general comments about system operation and utilization can be made.

Instrument Phase

While ACLS was a great aid in night and IFR conditions, it did not obviate the necessity for precise instrument flying. In fact, steady instrument navigation was possible. System parameters established a box-shaped acquisition window 10,000 feet wide, 670 feet high, and 1200 feet deep at its largest dimensions, about 4 miles behind the ship. This window could be slewed in azimuth but was generally centered about the final bearing. Therefore, it proved advantageous to get the aircraft down to glide slope intercept altitude (1200 feet) and established on the final bearing as expeditiously as possible. This allowed time to set up for autopilot and APC system checks.

Coupling

Pilots generally tried to enter the window in landing configuration. (Lowering the arresting hook also lowered the corner reflector which provided the SPN-42 operator with a specific source of radar reflectivity that ensured a constant lock-on, and prevented lock from shifting

positions on the airplane.) This was done on altitude and on centerline, with APC and autopilot engaged and with altitude hold mode selected. At this point, controllers reported lock-on, and the pilot received the "ACL Ready" and "Coupler On" discrete lights.

A needle check was conducted, consisting of a cross-check of the pilot's ASW-25 needle indication of aircraft position and the controller's indication. (With addition of the ARA-63 and associated SPN-41 radar systems, neither of which discriminates between aircraft, but each of which provides a common source of glideslope and lineup information via needles presentation, the pilot is provided with a very accurate cross-check of ACLS operation. This check, at time of lock-on, ensures that the shipboard controller is, in fact, locked onto your aircraft and therefore sending valid information.) With this check, the pilot was cleared to couple. The aircraft was not cleared to couple if, for some reason, it was above glide slope, because the resultant correction was a violent pushover that usually exceeded system limitation, and was especially uncomfortable in IFR conditions. If it became necessary to delay coupling until inside 3 miles (the normal distance to pushover from the 1200-foot pattern altitude), it was found that the pilot could fly a manual approach to maintain the aircraft within coupling limits.

Automatic Approach

Under normal circumstances, coupling was accomplished at approximately 4 miles. For the next mile, after the controller reported that he was sending commands, the aircraft corrected in azimuth only while maintaining altitude (normally 1200 feet). The pushover then occurred at 3 miles when intercepting a 3½-degree glide slope from 1200 feet. This distance, of course, varied with altitude at the time of coupling. Initial corrections at pushover were sometimes large, but decreased rapidly as the aircraft approached optimum glide slope until they became almost indistinguishable during the final phases of the approach.

During the approach, the pilot and RIO monitored the corrections by cross-checking needles, altitude, distance, airspeed, angle-of-attack, and rate of descent. At the same time, the pilot had to maintain his "feel" for what the aircraft was doing since voluntary or involuntary uncoupling was always a possibility. Pilots who were uncoupled for either reason were unanimous in the conviction that the transition was very difficult, since they had to regain, in seconds, the "feel" for the

aircraft that they would have had minutes to accumulate during a manual approach. All pilots "rode" the controls when coupled to be better prepared to take over instantaneously if required. They also tried to think ahead of the machine to determine what corrections they would have to make in the event uncoupling took place.

On KITTY HAWK there were five types of ACLS approaches available. Mode I was a fully automatic approach to touchdown. Mode IA was downgraded to a manual approach at no less than ½-mile. Mode II and Mode IIT were manual approaches flown utilizing the ACLS needles presentation. Mode IIT augmented the Mode II approach with standard commentary. Mode III was a standard Navy CCA talkdown with the controller utilizing information provided by the SPN-42 radar and data link system presentation. *Phantom* pilots generally requested Mode I or Mode II approaches. Mode IA approaches were disliked by most since uncoupling at ½-mile left little time to adjust to manual approach.

In addition, the automatic pitch trim feature of the autopilot tended to trim the nose up to two units higher than most pilots were accustomed to trimming themselves. When uncoupling, this caused an immediate pitch-up which the pilot had to control by pushing forward on the stick and retrimming; and this inside ½-mile! It was colorful. Crews that desired Mode IA approaches generally uncoupled between ¾ and 1 mile allowing more time for corrections, and many found that they could trim the aircraft to their desired setting prior to uncoupling to ease the transition.

Final Landing Phase

All aircraft carriers have a characteristic "burble," or area of disturbed air aft of the ship, created by the airflow around the ship's hull. The "burble" position and intensity varies from ship to ship and, for a given ship, is primarily dependent upon wind velocity and relative wind direction. In pilots' terms, the "burble" manifests itself as a "hole" where settling occurs requiring a power addition and a corresponding attitude correction. If these corrections are not made early enough or quickly enough, the aircraft will settle below glide slope.

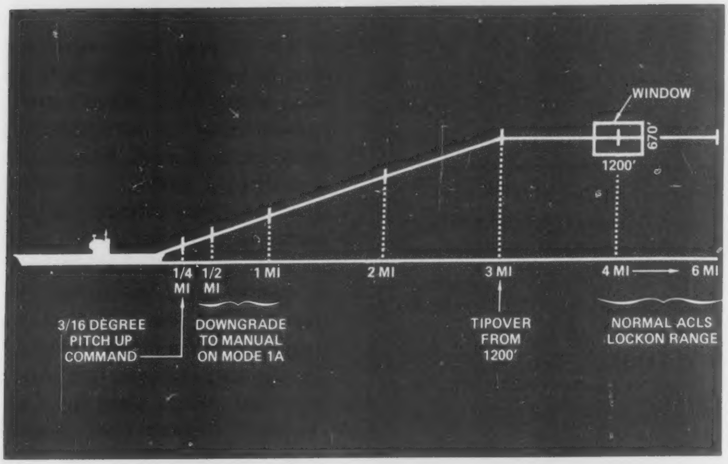
Initially on KITTY HAWK, Mode I aircraft were engaging a large percentage of No. 1 wires due to slow corrections in the "burble." Corrective action was taken by installing in the SPN-42 computer program an automatic pitch-up signal of 3/16ths of a degree to occur 7.5 to 8 seconds prior to touchdown, thereby moving the touchdown point farther down the deck to the No. 2, 3, and 4 wires. Touchdowns were invariably smooth. (There was very limited experience with a pitching deck. ACLS operation in this regime remains an unknown quantity for the *Phantom* crews aboard KITTY HAWK.) The automatic pitch-up command was based upon optimum wind conditions. Therefore, when there was a greater than optimum wind, hence an increase "burble," the Mode I aircraft had a greater tendency to engage the early wires, and conversely, a lighter than optimum wind increased the tendency for bolters.

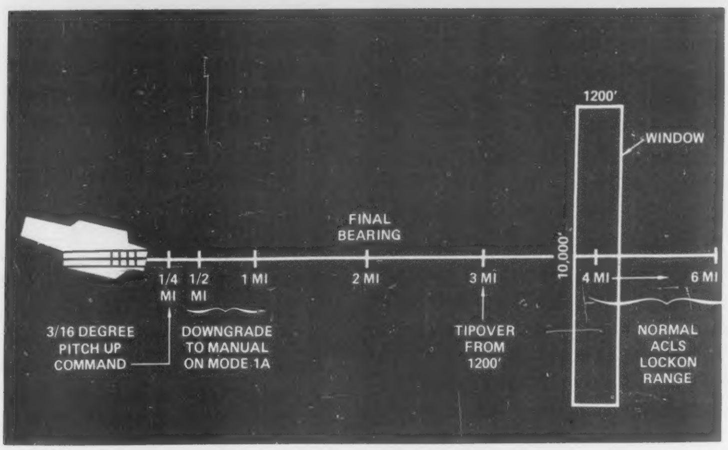
Knowing this, the pilots were able to anticipate what the ACLS would cause the Mode I aircraft to do in close to the ship. In the event personally set limitations were exceeded, they were better prepared to make the proper correction on uncoupling. Some pilots, knowing that the wind conditions were other than optimum, elected to downgrade to a manual approach at a greater distance to better prepare themselves for the "burble" correction.

Disengagement

Although the boarding rate was always high, a bolter was always a possibility. The transition to manual flight following a Mode I induced bolter was very difficult and could saturate the pilot with too many things to do at once. The pilot had to ensure disengagement of the AFCS and APC; the APC automatically disengaged with weight on the gear but the speed brake switch on the throttle quadrant was used to ensure positive disengagement. The AFCS was another story. It was

" . . . Even pilots who rarely used ACLS took comfort in the fact it was *there* . . . "





necessary to disengage the AFCS and the Data Link with the paddle switch since weight on wheels was not applicable to AFCS operation. The pilot had to accomplish this awkward movement while simultaneously rotating the aircraft. He also had to ensure that he released the paddle switch completely to retain stability augmentation as he left the deck.

Complete disengagement of AFCS and coupler was required since an aircraft leaving the deck still coupled could expect an overrotation that was extremely difficult to control, particularly at night or in bad weather. (If the aircraft is still in AFCS, any rapid back stick movement – such as that required to rotate on a bolter – causes the automatic pitch trim feature to trim the aircraft to full nose-up trim. Hence, the overrotation.) A few "colorful" bolters of this type did occur and pointed up the need for corrective action. To solve these problems, KITTY HAWK's fighter squadrons proposed a fix which was accepted and incorporated as Airframe Change 508. This change provided heads-up light indications of "APC Off" and "Coupler Off," and rigged the AFCS to disengage on touchdown with the "weight on wheels" scissors switch. Nevertheless, it is recommended that pilots use the paddle switch as a backup.

On a bolter, the pattern remained the same as for manual approaches with the aircraft turning to intercept the final bearing approximately 4 miles behind the ship. Cross-checks with the TACAN were necessary since the ACLS needles remained pegged until the aircraft was within 30-degrees of the final bearing. The turn could be made with the AFCS and APC engaged to facilitate early coupling for another ACLS approach.

Conclusions

Perhaps the greatest tribute to the success of ACLS lies in the fact that fully operational systems were jealously monopolized by senior commanders on dark moonless nights. When pilots decided that "they would rather do it themselves," the accuracy and consistency of ACLS information in the easy-to-interpret needles presentation contributed to better manual approaches. Even pilots who rarely used the automatic feature of ACLS took comfort in the fact that it was *there,* for that one bad night when vertigo had gotten the best of them.

Current rumors notwithstanding, the Automatic Carrier Landing System is not better than shore duty; it just makes the time in between a little easier.

Courtesy McDonnell Douglas *Product Support Digest*

Checklist Item

WHY don't we add the helmet visor to the takeoff and landing checklist? The March 1972 issue of APPROACH (page 33) recommends operating with the visor down at all times. Weekly Summary No. 11-72 implies squadron SOP requires visors down at all times and gives the premonition that glass fragments and debris will ricochet around cockpits in the future.

Aircrews generally use the shaded visor; however, even the individual who firmly believes in the protection offered by the visor occasionally finds himself airborne at night or on a overcast day with his visor up. The Weekly Summary clearly emphasized this problem area and stated "this incident could easily have resulted in the loss of an aircraft and possibly the crew."

Knowing that we will probably lose an aircraft and crew because the pilot forgot his visor seems like ample justification to take corrective action at this time to ensure the helmet visor is used. Squadron SOP and NATOPS set policy too often forgotten. Incorporating the visor into the takeoff and landing checklists will remind the aircrew to use the visor at the most critical times relative to bird strikes.

The main objection to adding the visor to the checklist is that it lengthens the checklist when common sense requires its use. We continually read accident reports stating the helmet visor was not down. The few additional seconds seem like a small price to pay for reducing the possibility of losing an aircraft and crew.

I feel the visor is just as important as the harness, and the checklist should be changed to read: Harness and visor – Locked and down.

LCDR D. F. AFDAHL, USN
ASO, TACELRON 129

The APPROACH article you cite states, "Operate with your helmet visor down at all *practicable* times." The *Summary* item, which concerned an A-6 pilot, says, "Although the A-6 NATOPS does not specifically cover flying with the visor down at all times, it is a personal safety factor that should be automatic with all pilots."

We believe that flying with the helmet visor down is highly desirable. The visor provides protection against injuries from bird strikes, cockpit debris in decompressions, and windblast during ejection.

There are many pilots who swear by the dual-visor helmet and fly constantly with visor down. There are considerations, however, which make it impractical to fly with a visor at all times using the present helmet-visor setup.

To reduce helmet bulk and weight, a large proportion of the fighter community has shifted to using the single visor in place of the dual visor. This, consequently, means only one visor, whether clear or tinted. Flights launched in daylight can be recovered under nighttime conditions or vice versa. During night carrier landings, reflections from various lights can and do distract pilots during this critical evolution.

Until such time as a visor becomes available which precludes the disadvantages associated with the existing visor, APPROACH will continue to point out the merits of flying visor-down when practicable.

Static Electricity

AN off-duty Navy mech was working on a T-34 belonging to the local flying club. While he was disconnecting the aircraft's fuel shutoff drain line which he thought was empty, leaking fuel soaked through his clothing to his underwear.

He stopped work and walked to a nearby shop to remove his fuel-soaked clothes. He removed his outer shirt, then rapidly pulled off his thermal underwear top. As he did so, static electricity was generated between the thermal underwear and his T-shirt. Fuel fumes in the thermal top burst into flames.

Panicked, the mech ran. Luckily, two alert observers tackled him and smothered the flames with a pair of coveralls.

Investigators stated that the only safe way to counteract the possibility of generating static electricity while removing fuel-soaked clothing is to first wet it down with water. This suggestion is also a good preventive measure for anyone on the receiving end of a liquid oxygen spill. (Note: In the case of a LOX spill, wetting down the affected clothing should be immediate to prevent both static ignition and frostbite.)

When working around flammable liquids, to prevent static build-up, use the least static-producing clothing fabric from the skin out – a cotton or other relatively static-free outer garment, cotton "middle" garments, and cotton undergarments.

Static electricity tends to generate in cool, dry atmospheres, generally from untreated synthetic fabrics rubbing on dissimilar fabrics

as in the case of "peeling off" clothing.

The static characteristics of Navy clothing are currently under investigation at the Navy's Clothing and Textile Research Unit, Natick Laboratories, Natick, Mass.

For other-than-spill situations, the following simple safety precautions will further reduce the risk of static electricity build-up:

- Never take off any garment while in the vicinity of an ignitable mixture or while handling explosive materials, indoors or out.
- Do not enter an ignitable atmosphere immediately after removing a garment, and do not carry the garment into such an atmosphere for at least 10 minutes after removal.

After removal of any garment or after generating static by any other means, reduce static electricity on the body by proper grounding procedures. If proper grounding procedures are not possible, grasp a water tap, water pipe, or any metal object with both hands for a few seconds. While this will not completely discharge the static electricity, it will help appreciably.

Wash Accident

BECAUSE of an accident in an aircraft wash area, one squadron is recommending wearing protective safety goggles while opening drums and spraying cleaning compound.

Recently when an ADJ opened a drum of aircraft-surface cleaning compound, the liquid, released from pressure, caught him in both eyes. He immediately flushed his eyes with water, then reported to the dispensary. His injury was diagnosed as moderate conjunctivitis. He was back on the job a day later.

Prompt irrigation of the eyes followed by professional medical treatment prevented serious injury. However, if safety goggles had been worn in the first place, there would have been no injury at all.

When handling and using irritating chemicals, take advantage of all the protective equipment you can get your hands on.

Head Save

AN AA working on the flight deck during launch saved himself from a serious head injury because he was wearing his flight deck protective helmet. The investigating flight surgeon said that otherwise the injury would have been "catastrophic."

The AA was on duty in the No. 2 jet blast deflector control station when exhaust from a turning RA-5C blew an unsecured nose tow approach ramp into the station. He was struck on the head, but his helmet absorbed the blow. However, hand injuries sustained at the same time required two separate operations with a 6-week healing period after each.

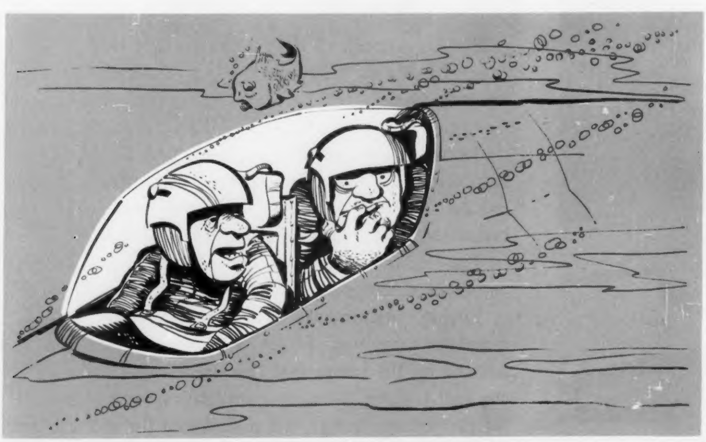
Pool Death

LAST summer, a navyman drowned in a neighbor's pool when he apparently overestimated his ability to remain underwater.

He dove to the bottom, took off his face mask, and lay face down. After a few minutes, spectators became concerned and pulled him out. He could not be revived.

Many swimmers breathe deeply and rapidly before submerging to stay underwater longer. This hyperventilation alters the blood gases. This can "turn off" the breathing mechanism of the body, so to speak.

All swimmers should be aware that hyperventilation can work against them and result in unconsciousness and drowning. ◄



'The clouds are green because it's water.'

'A-4 Off the Bow, You're Dumping'

AS the A-4F *Skyhawk* was launched, the air boss noticed a large quantity of fuel streaming from the aircraft. He advised the pilot, "You're dumping."

The pilot checked his fuel transfer ON, his fuel dump switch OFF, and responded, "Rog, fuel dump secure." He then noticed fuel fumes in the cockpit and selected ram air.

Seconds later the fire warning light came on, and although there was no secondary indication of fire, he reduced power and informed the tower. He was instructed to stand by for immediate recovery.

The pilot jettisoned his external tanks and commenced dumping. The fire warning light went out. Engine instruments were normal, but the fuel quantity gage was frozen at 5000 pounds. He was advised by the tower that the aircraft was dumping. As the fuel transfer light came on (indicating less than 1600 lbs of fuel remaining), the pilot asked for and was given clearance to land. During approach and arrestment, his radio and other electrical gear failed.

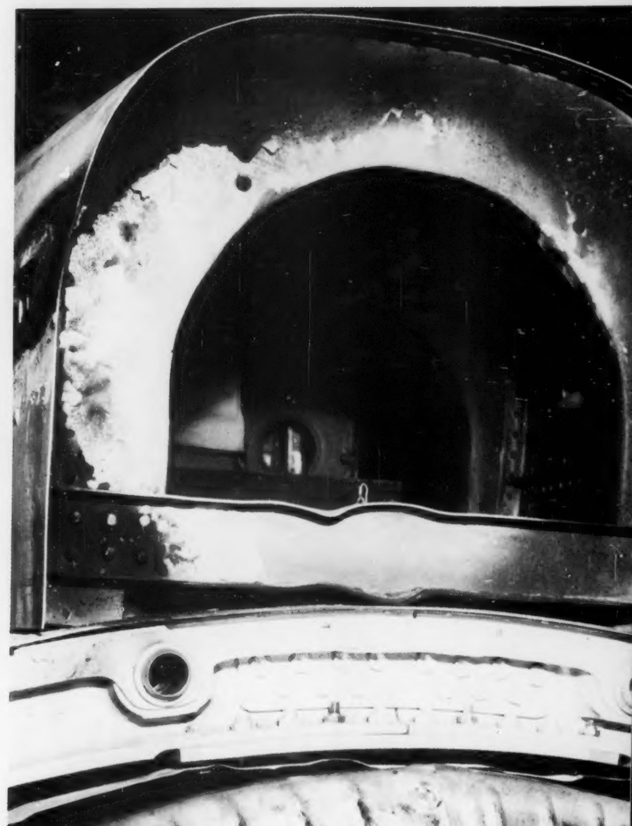
Epilogue

The fuel observed coming from the aircraft by the air officer was coming from the fuel tank filler hole behind the cockpit. Although it was not visible to Pri-Fly, escaping fuel caused a fire in the hump resulting in substantial damage to the airframe and electrical wiring (see photos).

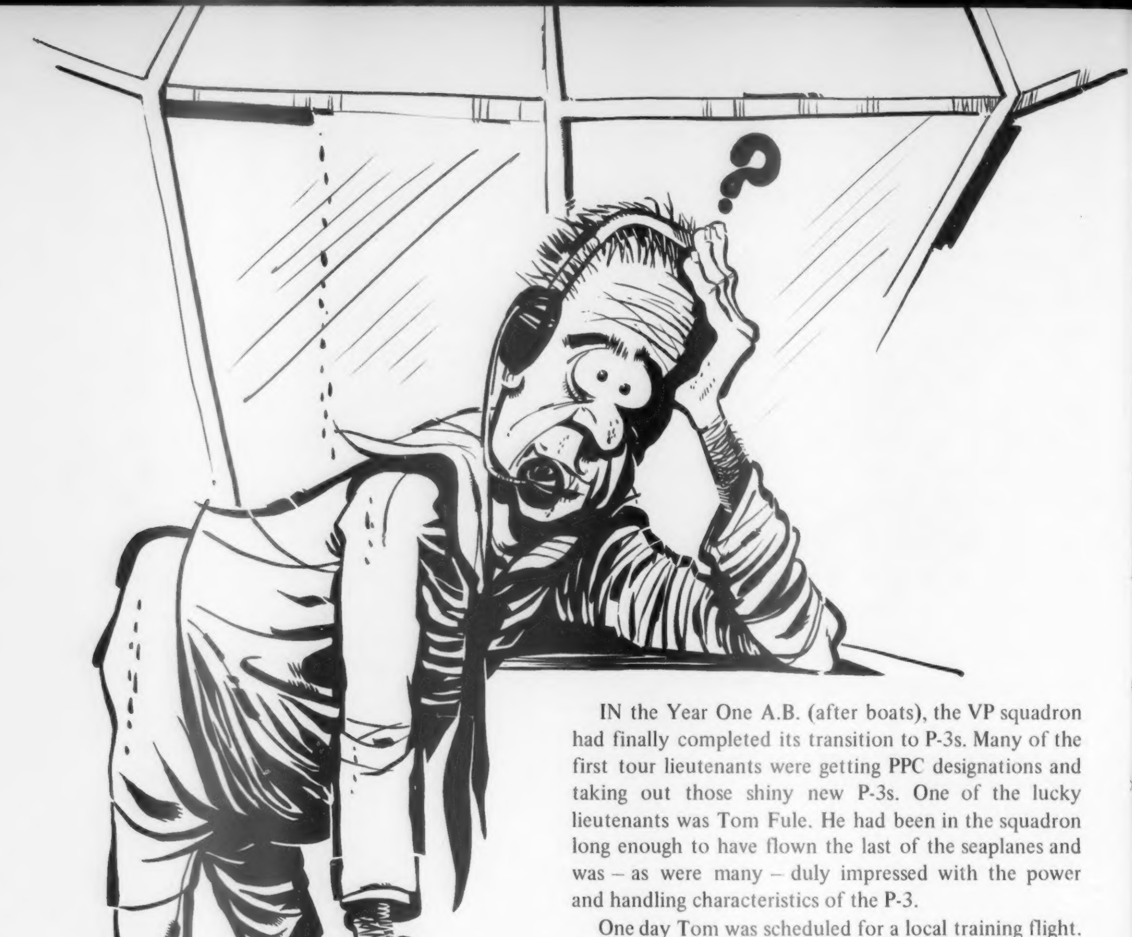
The fuel spillage was due to the absence of the tank filler cap. Unfortunately, neither plane captain nor pilot checked for security of the tank filler cap on his preflight inspection, as required by both MRC and preflight checklist. Had they so checked, this accident would have been avoided.

Flying the *Skyhawk* without the fuselage tank filler cap secured is potentially catastrophic. At present, the access door covering the filler cap can be closed with the filler cap improperly secured or missing. However, A-4 Airframe Change 508 will provide a spoiler bar that will prevent closing the access door with the fuel cap missing or unlocked.

Airframe change notwithstanding, this accident provides one more good reason (as if more were needed) for all concerned to religiously complete required checklists. ◄



Photos show fire damage in the hump area just aft of the fuel filler cap.



In The Year One A. B.

By LCDR George E. Ruckersfeldt

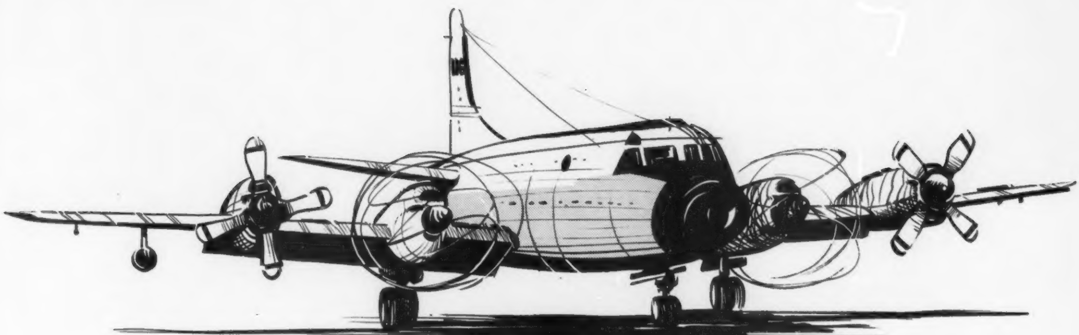
IN the Year One A.B. (after boats), the VP squadron had finally completed its transition to P-3s. Many of the first tour lieutenants were getting PPC designations and taking out those shiny new P-3s. One of the lucky lieutenants was Tom Fule. He had been in the squadron long enough to have flown the last of the seaplanes and was – as were many – duly impressed with the power and handling characteristics of the P-3.

One day Tom was scheduled for a local training flight. His copilot was LT Goalong.

After a few practice instrument approaches, Tom decided to shoot a few touch-and-gos. (He had to stop calling it a splash-and-dash.) The first one was nice and smooth. Tom was filled with so much confidence that he decided to make the next landing on three engines.

Number 1 was feathered on the downwind leg. At the 180 LT Goalong called the tower for a full stop, three-engine landing. They were cleared to land. Again Tom set the bird down with style. During rollout they requested and were granted clearance back to the approach end of the runway.

In the tower the operator noted the P-3 taxiing with one feathered but thought, "Those P-3 characters are always starting and stopping engines on the deck." He didn't give the aircraft a second thought until LT Goalong requested takeoff clearance. The tower operator looked out and saw the P-3 at the far end with No. 1 still feathered. He hesitated momentarily, then remembered that P-3 engines are sometimes started on the runway for practice. He cleared them to go.



Fule guided the P-3 down the runway and with finesse took off with No. 1 at attention. This was a real piece of cake, so he feathered No. 4 on downwind. At the 180 LT Goalong dutifully called "three down and locked" and requested a full-stop, two-engine landing. This was granted and Tom greased it on. How sweet it is!

Tom was cleared once more to the approach end – with two engines feathered. "Oh well," the tower operator thought, "they'll probably start them before takeoff."

LT Goalong called for takeoff. The tower operator looked at the aircraft, squinted, then reached for the binoculars. Yup. Sure enough! Those outboard engines were still feathered. *This* was something he hadn't seen before. A little voice suggested that he get involved and find out what was going on.

The tower operator advised LT Goalong to hold short, picked up the phone, and called the squadron operations office. He asked the officer (wouldn't you know, the Ops officer answered the phone?) about two-engine takeoffs and received an unprintable reply. When he told the Ops boss that one of his aircraft had requested one, the comment was equally unprintable. The operations officer directed the tower operator to have the aircraft return to the line.

Tom heard the transmission but it didn't bother him.

Continued

He knew of the upcoming night operation and figured Ops wanted his plane as a backup. He taxied back with No. 1 and No. 4 still feathered and grinning from ear to ear, pulled into the chocks.

As he started down the boarding ladder, he saw a procession heading toward the aircraft. There they were: CO, XO, Ops, NATOPS, and the ASO coming toward him at a brisk pace. The CO was in the lead with each of the others fanned out in a perfect right echelon, one pace to the right and one pace behind. (It was one of the few times a lieutenant has been honored by a reception committee.) He stepped off the ladder and turned to face the group. The CO looked at him and said to the XO, "LT Fule is no longer a PPC." The XO looked at Tom and said to the Ops Officer, "He will not take out any flights as a 2P." The Ops officer looked at Fule, then said to the NATOPS officer, "LT Fule needs a recheck tomorrow." The NATOPS officer turned to say something to the ASO but didn't speak. The ASO was crying.

The moral of this story is obvious. If you want to make a two-engine takeoff in a P-3, don't ask the tower for clearance. ◄

Unintentional Wheels-up Landings

RECENT reports indicate an increasing trend in unintentional wheels-up landings. To date in FY-72, 13 unintentional wheels-up landings have occurred. Ten of these took place in dual cockpit configured aircraft, seven of which were side-by-side.

Since the introduction of aircraft with retractable gear, unintentional wheels-up landings have occurred with distressing regularity. They usually eventuate from an underlying interruption of established habit patterns. Procedures and devices have been incorporated to prevent such mishaps, but no sure cure for a wandering mind has yet evolved.

One of the major causes of unintentional wheels-up landings in dual cockpit configured aircraft is considered to be a complacent dependence of one crewmember upon the other, and indicates lack of crew coordination and supervision.

A revitalization of awareness of the problem and a review of some precautions are considered minimal in alleviating unintentional wheels-up landings:

- Compliance with checklists by all crewmembers.
- Recognition of an interrupted habit pattern as a warning signal.
- Optimum positioning of the wheels watch providing obstruction-free observation with adequate time for warning and waveoff.
- Positive gear down report prior to tower personnel issuing a landing clearance and, whenever possible, a visual check by the tower.
- Landing gear warning systems properly maintained.

Pilots should be aware that wheels watches are not posted at civilian airfields and may not be posted at all military facilities. Further, civilian and Air Force tower personnel do not require a positive gear down report prior to issuing landing clearance.

Adapted from NAVSAFECEN Flight Safety Advisory 7-72 (April 1972)

Fatigue is listed as a contributory cause for failure of the pilot and copilot to make proper use of NATOPS checklist.

RING MY CHIMES

AN E-2B *Hawkeye* took off shortly before dark on a scheduled night fam. The PUI (pilot under instruction) was in the left seat and the IP (instructor pilot) in the right.

Fifteen minutes after takeoff, the E-2 entered the night FMLP pattern at homefield. The IP demonstrated a mirror landing, then permitted the PUI to shoot one. FMLP practice was terminated after a while and the *Hawkeye* remained in the pattern for some normal touch-and-gos.

The PUI completed 15 touch-and-gos. As he turned downwind for the 16th, the IP pulled the power back on one engine and told him to set up for a simulated single

Fire did extensive damage to the port engine nacelle.

Interior forward equipment compartment damage.

engine landing. During climbout after the second simulated single-engine landing, the IP pulled the right power lever back to simulate an engine failure on takeoff. The PUI raised the gear, retracted the flaps to 10 degrees, and maintained 120 knots during the climb to pattern altitude.

Just prior to reaching the 180, the instructor called the tower and reported "three down and locked, touch-and-go, simulated single-engine." About this time, the PUI asked the instructor to complete the engine secure checklist and the landing checklist. The instructor, concentrating on the expected tower clearance, failed to complete the landing checklist.

The E-2 was cleared for landing, and a minute later landed wheels up. It skidded down the runway and stopped 35 feet right of centerline. The pilot and copilot escaped uninjured through the cockpit overhead hatches.

According to the aircraft mishap board, "This accident was a direct result of noncompliance with the E-2 NATOPS manual. The manual states that 'the copilot shall challenge the pilot on each checklist item, and shall receive the proper reply prior to making the next challenge. The copilot shall visually monitor the action of the pilot as each item is completed.' During this flight, the pilot and copilot statements indicate that the checklists (more specifically, the landing checklist) were not done by the challenge and reply method but by the copilot (instructor pilot) verbally going over the items."

This is clear enough; however, there were other factors present in this accident which merit discussion.

The landing gear had remained down in the pattern, *until the time of the simulated engine failure on takeoff.* This departure from the routine of leaving the gear down after each landing should have rung some warning bells in the pilots' minds.

Distraction was another factor, i.e., on the downwind leg the instructor pilot took time to call his base radio and report his ETA in the chocks.

Finally, the instructor was suffering from fatigue. The night preceding the accident, he flew another training flight. Takeoff had been scheduled for 1820 but was delayed until 2115. After 2 hours in the air, the pilots learned that weather at homebase was below minimums. They diverted to another base, arrived at 2400, and got to bed at 0130.

They arose at 0700 (the day of the accident) and returned to homebase. The instructor pilot then put in a full day's work on a priority project. He remained in the squadron area until takeoff that night.

It is also noteworthy that the instructor pilot's entire food intake during the day consisted of donuts and coffee for breakfast, a hot dog and coke for lunch, and a hamburger and orange juice for supper.

The combination of a relatively inexperienced pilot, a fatigued instructor, a demanding flight (simulated emergencies), habit pattern interruption, and distraction set the stage for this mishap. The final straw was the pilots' failure to properly complete the landing checklist.

Don't let it happen to you.

Ordnance Safety Precautions

THE HARD WAY

0500 is a rather unusual time to muster for a day's work but then this story concerns an unusual happening; so maybe it's not too strange. It was the kind of morning, however, when one looked at the ominous low-hanging clouds and wondered when the cloud burst would come.

In any event there wasn't anything the ordnancemen could do about the weather, and they quickened their pace towards the revetments to repair a minigun on one of the detachment's H-1 gunships.

The ordnancemen were rated, well-qualified to perform the task, and had been aboard long enough to be known as "old hands." One repaired the minigun located in the left door of the crew compartment while the other installed a new power switch. A power cable was attached to the standby generator battery pole. The battery was turned on and after ascertaining the switch worked correctly, the battery was turned off. One of the men then rigged the repaired minigun for dry firing while standing between the aircraft's skid and crew compartment threshold.

The battery was turned on and *KAPOW*! The port rocket pod salvoed six 2.75 rockets into a revetment wall. A fire was started by the rocket motors, but was quickly extinguished. Luckily, none of the warheads traveled far enough to arm and did not detonate as they struck the revetment – *a mere 15 feet away*! All 6 rockets penetrated the PSP (perforated steel plating) side of the sand-filled, 5-foot thick revetment wall. *One of the war heads went through the PSP on the far side of the wall and stopped with 6 inches protruding.*

All armament switches and circuit breakers were found to be in proper working order. However, while checking for stray voltage/shorted wiring, it was discovered that more than two volts differential existed between the minigun control box and the aircraft's airframe. The control box had been modified by the detachment and consisted of one relay encased in a small metal ammo box. A number of power cables, control cables, and a crossover drive lead enter or leave this box. Power for the modified control box is taken from the standby generator battery pole. This is believed to be the source of stray voltage which caused the rockets to fire.

It was even more important to discover why two major safety precautions (removing the rocket firing lead from the pods and the removal of rockets from the tubes) were not observed. The incident report did not shed any light on this point nor was it required by the reporting system.

If one can second-guess the investigation, you can bet your sweet bippy that those who were questioned probably answered with, "I don't know," "I thought," "I assumed." Good gracious!

The senior of the two did not supervise the actions of the 2-man work party.

To satisfy other guncockers and knowledgeable persons who may have been left hanging concerning the unexploded warheads; they were rendered safe by the explosive ordnance disposal team. No injuries resulted and only limited damage (cracked chin bubble and a hole in one rotor blade) occurred – *this time*.

One may suppose that of all Navy ratings, ordnance types are subjected to more dangers, on a continuing basis, than any other rating. From their first day as a striker until released, retired, or expired, they are bombarded with general safety precautions, shop safety precautions, line safety precautions, and ordnance handling precautions. Believe it or not, men, all these safety precautions have been developed for your *continued* safety, health and welfare. *Most* were developed the hard way. All you have to do is observe them – *every time!*

What you don't know may not hurt you, but what you suspect can sure be disturbing.

Ace L.

Bravo Zulu

Following a bombing mission in Southeast Asia, CDR Stanley R. Arthur, VA-164, operating from the USS HANCOCK, leveled his A-4F *Skyhawk* at FL 235. As he did so, he noticed an odor coming in around his oxygen mask.

Loosening his mask momentarily, CDR Arthur verified a strong odor of oil or hydraulic fluid in the cockpit. He cinched his mask tightly then noticed smoke coming from under the instrument panel.

Notifying his wingman, he dumped cabin pressure and dropped the RAT. The smoke cleared; however, his wingman reported smoke coming from the starboard oil vent.

CDR Arthur noted all engine instruments normal, set his power at 87 percent, took up a heading for a divert field (Da Nang), and declared an emergency. Five minutes later, oil pressure began fluctuating and the 20 percent oil light came on.

Five miles from the divert field, with oil pressure near zero, the wingman reported smoke coming from the engine bleed air manifold. Shortly thereafter, two violent explosions were felt and the wingman reported flames from the tailpipe. Sensing engine deceleration, CDR Arthur secured the engine. At this time he was at 3000 feet and 2 miles from the runway.

Fearing a probable impact in a heavily populated area of Da Nang if he abandoned the aircraft, CDR Arthur elected to attempt a landing. He felt he had the runway made and could eject on final if necessary.

He slowed the *Skyhawk* and "dirtied up" as the engine continued to windmill. Touching down safely on the runway, he made a successful midfield arrestment. He exited the damaged aircraft without injury.

By his outstanding skill and good judgment, CDR Arthur succeeded in saving a valuable aircraft and prevented certain injury and loss of life to the surrounding community.

Well Done!

Subsequent to CDR Arthur's feat of airmanship, COMNAVSAFECEN requested he comment on his personal approach to safety.

The "Challenge" of Emergencies

I'VE spent many hours going back through my past flying years to see if there is something I do that is a departure from the norm. I feel there isn't. I'll attempt to present my philosophy concerning flying, and perhaps you can find something of value.

I believe an aviator must have a basic love of machines. He must be interested enough to dig deeply into maintenance and NATOPS manuals. Weekly safety summaries and articles in professional magazines should be approached with the armchair quarterback attitude: "What would I have done?"

A practice I have followed, about which I feel very strongly, concerns the writeup of gripes on aircraft. I always check back on the writeoff, and if it doesn't answer my questions, I go to the people concerned for a brief. I've found this information often gives tremendous insight into inflight troubleshooting and often permits early diagnosis of impending problems.

I believe perhaps a subtle change in our instruction techniques would shift the emphasis from handling emergencies as a "do or die" maneuver to an exercise in finesse, on par with an on centerline, on glide slope GCA, or an OK 3 wire. This would help alleviate the initial fright that many pilots experience.

Finally, I've never looked upon an emergency situation as a threat but rather . . . a challenge. I feel this attitude has given me a headstart when attempting to handle rapidly developing situations.

The evolution at Da Nang was an interesting ride . . . the memory of which I'll treasure for many years.

CDR S. R. Arthur, U. S. Navy

For want of a cotter pin,
The lower pitch link bolt backed out.
For want of a bolt,
The rotor head suddenly stopped.

Views of damage sustained by port side of fuselage (above) and damage to engine inlet screens and fairing (right).

Maintenance Action Incomplete

IT all began with an oversight (forgotten cotter pin), was continued by incomplete paper work (no MAF), and was complicated by lack of work continuity (pulling people off other jobs). Lack of communication, i.e., no entry in the passdown log, no word to the supervisor as to the status of the work, and an incomplete daily inspection by the plane captain – all contributed to a breakdown in maintenance procedures and an accident. Here's how it happened:

- On the morning of 31 December the forward rotor head was being changed. It was determined that the pitch change rod end bearings were worn and needed to be replaced. An ADJ1 advised an AMH1 of the work to be done. *No MAF was issued.*
- An AMH3 was pulled off another job and detailed to do the work. He removed only the green pitch change rod because the swashplate assembly is not to be rotated until the new head is installed and aligned. The red and yellow lower pitch change rod bearings could not be

removed because of interference from the transmission A-frames.

• The AMH3 *forgot* to install a cotter pin in the nut of the green pitch change rod. He also loosened the red lower bearing nut, but being unable to proceed further, reinstalled it only finger tight. He hurried to finish this chore and returned to his original job. The day crew secured, but the AMH3 volunteered to remain with the night check crew to complete his previously assigned work. *No entry was made in the passdown log concerning 07.*

• Many maintenance jobs require one rating to take over at the point where another rating has done its job. In this case, for example, after the metalsmith had changed the bearings, it became the task of the mechs to reconnect the upper portion of the rods to the head. The ADJs, assuming that the bearings had been changed, installed the new rotor head, connected the rods, torqued the retaining nut, and safety-wired where necessary. The night check supervisor completed the QA inspection – unaware of the incomplete work on the bearings.

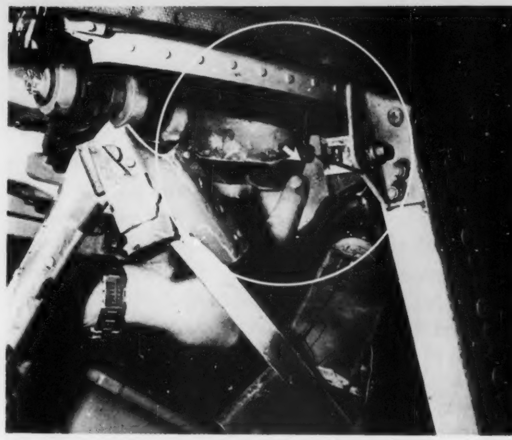
• Next day the rotor blades were installed.

• The squadron had begun a 2-day back-in-the-saddle program after the holidays. It was one of those rare occasions when no flights were scheduled, giving maintenance the opportunity to conduct an extensive inspection of all aircraft.

During the inspection an oil leak was found on 07, one of the *Sea Knights.* The inspection of 07 stopped when the discrepancy was found. The fact that the aircraft inspection remained incomplete resulted from a breakdown in communications.

A turnup pilot was requested by the Maintenance sleuths to determine the exact location of the oil leak.

Between 20 and 30 percent N_r, the aircraft gave two definite bounces and began "walking" and rotating to the right. During rotation the aircraft vibrated so severely that the pilot immediately secured the rotors and engines. Line personnel in the area hit the deck to



Finger points to partially withdrawn lower pitch rod bearing bolt.

avoid flying debris.

The aircraft stopped after a complete 180, and the pilot secured the cockpit switches. There were no injuries and no fire. The photos show to what extent the helicopter was damaged. A lower pitch link bolt had backed out causing sudden stoppage of the forward rotor head. (See photo above.)

The CO of the squadron commented that strict compliance with procedures of OPNAVINST 4790.2 have been instituted. Further, he directed revision of certain squadron SOP pertaining to work functions within the maintenance department and turnups of aircraft by maintenance test pilots.

Present aircraft maintenance procedures have evolved through decades of good maintenance management and experience. These procedures, if followed, are designed to prevent the events that took place in the preceding mishap. Although this ground accident involved a helicopter, the maintenance implications are so common they can be applied in the broadest sense to maintenance work on anything – aircraft, vehicles, ships, and even ground support equipment.

Flight Deck Catastrophies

SLIGHTLY over 3 years have elapsed since the tragic flight deck fire on USS ENTERPRISE (CVAN-65). Yet, a recent incident report describes how a carelessly positioned jet starting unit charred personal clothing stowed inside a blivet mounted on an aircraft pylon.

The blivet could have been a fuel tank, bomb, or rocket pod. Avoidance of this type hazard requires continuing education of personnel, published diagrams for air starter positioning, and complete attention of all flight deck "huffer" operators, directors, aircrewmen, and squadron supervisors.

Examine your flight deck operations NOW.

COMNAVAIRLANT *Weekly Safety Bulletin*

Because of its length, the following letter is presented as a separate article rather than as part of the regular Letters to the Editor page.

Anyone for 'Arcing Downwind?'

Lakehurst, N.J. – A number of issues ago, a letter cautioned about landing on the downwind side of the runway with a significant crosswind, presumably because that would leave you with less runway to drift around on in the event of lost control.

Alas, so true! A large number of accident reports to date will verify the fact that strong crosswinds can and will push a landing aircraft right off the side of a runway, especially when tire traction is poor. As many pilots know too well, once the drift starts and the tires lose traction due to side drift, there is very little that can be done to regain control. Midfield gear is an answer, but may not always be available.

Wouldn't it be nice if someone came up with a new technique that would tame these crosswinds? Well, they have. Back in the Forties, as a matter of fact. Called the "arcing downwind" technique, it was used effectively in the old tailwheel-type aircraft for saving wingtips and landing gear, and sometimes airplanes. Execution of this technique required the pilot to land the plane on the downwind side of the runway with the aircraft heading *and tracking* along a path about three to five degrees upwind of runway heading, using conventional upwind-wing-down approach (see diagram).

After touchdown, the pilot feeds in enough *downwind rudder* to make the aircraft follow a gentle arc, allowing it to cross the centerline to the upwind side of the runway and then slowly back towards the downwind side again, at which time the plane is at fast taxi speed.

The pilot essentially is using this skewed lineup to obtain more effective runway width, and uses the downwind rudder to simply keep the aircraft *headed in the direction of travel*. What actually happens is that the centrifugal force generated in the arc approximately balances the side force of the crosswind and removes most of the side loads on the main gear tires. This, in turn, avoids the tipping moment and, by keeping the main gear tires from drifting, it also leaves braking control of the aircraft with the pilot.

It does take some getting used to, lining up off runway heading and deliberately using (gently, gently) downwind rudder, but it does work very well. It could be a lifesaver if you ever get stuck in a situation where you have to operate in a crosswind, especially on a slick or icy runway. It can work just as well on takeoff, too.

CAPT C. L. Axtell, USN
NATF

• This procedure, rumored to have been used frequently by *Skyhawk* drivers, BS (before spoilers), is still food for thought, so we'll offer it for consideration by our readers, subject to a few comments.

Glad to see you recognize that the method requires a certain finesse in execution. For one thing, there is a real possibility of going off the *upwind* side of the runway if the pilot goofs. Also, it requires sufficient ceiling/visibility during the approach to permit the pilot time to plan the desired lineup and heading at touchdown.

An important consideration in adopting any normal procedure for inclusion in NATOPS is that it be easily repeatable by the average naval aviator. Is the arcing downwind method easily repeatable? This is a question best answered by designated test personnel or the operators of each model aircraft. Nevertheless, we can certainly visualize emergency situations where the arcing downwind method might be the only way to save the day. For example, a highly experienced commercial airline captain declared recently that the use of this method enabled him to safely land an airliner during heavy rains and massive crosswinds which accompanied a hurricane.

How about it readers? Anyone ever find this method worth the risks?

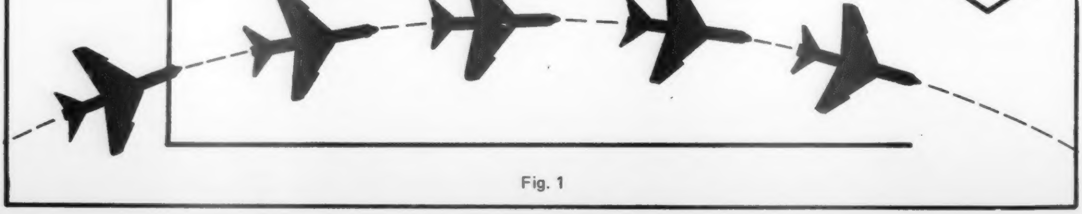


Fig. 1

Letters

to the Editor

Always do right. This will gratify some people and astonish the rest.

Mark Twain

The Constellation Aquila.

Printing Errors

Due to an oversight by the printer, an unknown quantity of the May APPROACH was forwarded to the Fleet *incomplete*. Pages 1 through 8 and 41 through 48 were duplicated.

APPROACH requests that any unit or individual who received incomplete magazines call the Editor (Autovon 690-1321) stating the number and how many replacements are desired.

If Autovon is unavailable, drop a line to the Safety Education Dept., Naval Safety Center, NAS Norfolk, Va. 23511. Use an Anymouse form.

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request.

Address: APPROACH Editor, Naval Safety Center, NAS Norfolk, Va. 23511. Views expressed are those of the writers and do not imply endorsement by the Naval Safety Center.

Arrow points to the tire in question.

Appearances May Be Deceiving

USS F.D.R. – While reading the March 1972 issue of APPROACH, a shipmate and I discovered in the photograph on page two what appears to be a rather ragged nose wheel tire. The photo shows an F-4 aircraft being hooked-up for a catapult launch.

After coming to the conclusion that the picture was not blurred, we decided to write and ask what you think is wrong with the tire. We would like to know if you think this tire is safe.

AN S.K. Howard
AA J.D. Dennard
AIMD IM-2 A/F Tire Shop

• To make a definite judgment on the safety of this tire based on a photograph is beyond our capabilities. Our experience does suggest, however, that the ragged appearance is probably caused by minor tread chunking. Some squadrons, as a matter of course, have their plane captains trim this flayed rubber. The determining factor as to a tire's worthiness, considering normal wear, are the "wear marks." These manufactured impressions in the tire afford a readily visible gauge as to tire reliability.

High Density Areas

NAS, Willow Grove, Pa. – I would like to commend LCDR J. R. Howard for his fine article, "Flying in High Density Areas" in the April APPROACH.

Operations personnel at NAS Willow Grove continually receive complaints and comments concerning departure and arrival delays, low altitude routing of turbojet aircraft, and requirements to adhere to standard routings.

ATC personnel have attempted to alert local users through newsletters, briefings, and close guidance for those who are planning flights. But wider dissemination of the air traffic situation in the Northeast United States has been, is, and shall remain extremely important. As a duty officer, I have seen too many instances of pilot frustration, confusion, and emergency fuel states emanating from an unexpected encounter with the New York area air traffic control complex. Mr. Howard's article should occupy a conspicuous spot in all flight planning rooms.

LT Gregory B. Snyder
Asst. ATC Officer

• We concur, Greg. Thanks for taking time to express your approval of the article. Anyone contemplating flight into high density areas would do well to use "Flying in High Density Areas" as a checklist during the planning stage.

Parachute Flare Kit

Ministry of Defence, Whitehall, London SW1 – Regrettably, APPROACH's aircraft recognition and recognition of national markings are not up to the general high standards of the magazine.

With reference to April '72 letters – operation of Schermully flares is as stated by LT Reiner. There are some provisos: following firing of a flare, it is desirable to avoid maneuvering into its glare; on firing, the flare is ejected behind and to the side of the aircraft and is subsequently suspended by parachute. When a flare is fired below 1500 feet above ground, there is the possibility of a ground fire, since burn time is about 80 seconds.

The photo clearly shows the mounting position as two white dots on the tailwheel yoke assembly. The flares are about 2½ inches in diameter and about 15 inches long.

Whereas the aircraft depicted is similar to your H-34 series, the caption is less than accurate in other respects. It is in fact a Wessex Mark 31, manufactured by Westland Helicopters, Ltd. It is not owned by the Royal Navy, but by the Royal Australian Navy – hence the kangaroo in the roundels.

So brush up that aircraft recognition. Remember, since you and I in Headquarters are always saying that for flight safety it is attention to detail that matters, it behooves the flight safety magazine to have its facts right *all* the time.

Keep up the good work – APPROACH is widely read and enjoyed by the Fleet Air Arm.

C. J. Horscroft
Lieutenant Commander, Royal Navy

See next Letter

FPO, San Francisco – Rather than being a picture of a Royal Navy Westlake, is it not a Royal Australian Navy Wessex

FLIP Changes

THE DEPARTMENT of Air Force, Headquarters Aeronautical Chart and Information Center, St. Louis, Missouri has notified the Naval Safety Center of the following changes to FLIP documents:

• Effective with the 25 May 1972 issue, the VFR Supplement and Aerodrome Sketch Book will be combined into a single publication. The VFR Supplement dated 22 July 1971 was the last issue of that FLIP in the present format.

A MAN (Military Aviation Notice), effective 25 May 1972, has been issued in lieu of the scheduled VFR Supplement for 1 March 1972.

The Aerodrome Sketches dated 9 December 1971 was the last issue of that FLIP in the present format.

All holders of the aforementioned FLIPs are requested to take extreme care in their handling to assure extended life until the 27 May 1972 issue.

THE DEPARTMENT of Air Force, Headquarters Aeronautical Chart and Information Center, St. Louis, Missouri has notified the Naval Safety Center of the following change to FLIP Documents:

• *Mode C Transponders.* Some transponders are equipped with a Mode C automatic altitude reporting capability. This system converts aircraft altitude in one-hundred-foot increments to coded digital information which is transmitted together with Mode C framing pulses to the interrogating radar facility. Aircraft equipped with transponders that have altitude reporting capability will activate this Mode in areas under FAA jurisdiction, unless otherwise directed by ATC or unless equipment error has been reported to be in excess of 125 feet.

helicopter made by the Westland Company?

LCDR E. W. Hosken, Jr.
COMFLTAIRHAWAII Staff

Another Letter

RAN Air Station NOWRA NSW – The helicopter depicted in your article is a Westland Wessex Mk 31B of the Royal Australian Navy as shown by the airframe designator RAN WA 226 and the kangaroo in the roundel.

The Schermully flare installation consisted of two flares arranged to fire 45 degrees to the starboard bow of the aircraft and 10-15 degrees below the horizontal. They were never used in the RAN for a number of reasons: the RADHAZ problem was prohibitive in shipboard operations . . . the flares are of very little use in an emergency . . . to be of use, at least one of the flares must be burning when it reaches the ground – with consequent risk of bush fire. I was trained in the night use of Schermully flares during my Helicopter Instructor's Course with the Royal Air Force in the U.K. and confirmed some of these criticisms of the flare.

- After the flares are fired, the pilot must begin a steeply banked turn to remain in proximity to the area of illumination.
- The brilliance of the flare destroys what night vision the pilot has and restricts the area of useful illumination to a small circle on the ground directly below the descending flare.
- If any wind exists, the pilot is forced to fly virtually the whole descent downwind to a very low level to ensure he can turn into the wind and keep the lighted area ahead for the approach and landing. The rate of movement of the flare across the ground is such that . . . the touchdown area is not illuminated until the very last moments of the approach – if at all.
- If any restrictions to visibility, haze, smoke, mist, fog, cloud, or precipitation exist, the reflected glare serves to rob the pilot of his night vision. It actually worsens the situation to a dangerous degree.

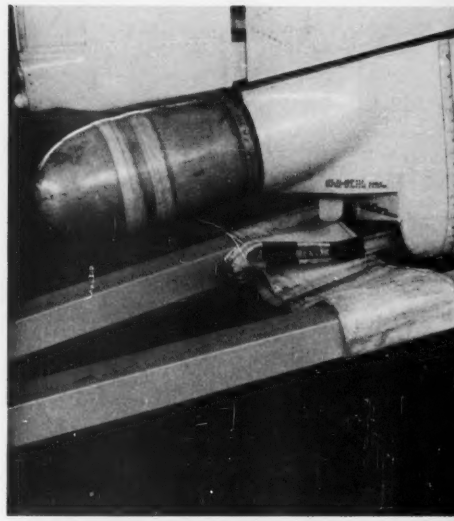
I would like to say how much all members of the RAN Fleet Air Arm admire your magazine and that each issue is eagerly sought and the contents discussed at great length.

LCDR E. S. Bell A.F.R. Ae.S RAN
CO HT 725

● Our faces are red, your words are true. We goofed it up *Royally*. Aussies, pardon us too.

CORRECTION

In the May '72 issue of APPROACH the article, "A Look At Helicopter Safety," beginning on page 10, was incorrectly attributed to CDR J.E. Driscoll, CO HC-7. The straight story is that it was HC-7's ASO, LT J.E. Driscoll, who broke the article loose from the bottom drawer, updated it, and submitted it through his skipper, CDR J.E. Woolam. Many thanks, gents, for your good work.



S-2 MAD Boom Head Crunches

Victoria Int'l Airport, Sidney, B.C. – As users of the CS-2F, the Canadian Forces have always read CROSSFEED avidly to acquire new ideas on mutual problems. It was with surprise, however, that VU 33 maintenance personnel read the February '72 issue regarding the fix for MAD boom head crunches.

The CAF, formerly RCN, has been using a system as depicted in the photograph since 1957 – shortly after the aircraft were acquired. The system of the bellyband has proven very successful both aboard carriers and ashore.

The material that is commonly used for the bellybands is natural colored Duck Cotton Cloth of 9.4 ounces weight, cut 36 x 80 inches.

I hope this information will be of some value to S-2 users. VU 33 looks forward to each and every issue of this worthwhile publication.

Major G. D. Westwood
Commanding Officer, VU 33

● Many thanks, Major, for passing along your method of protecting the MAD boom heads on the S-2. One of the best examples of feedback, to those in the publishing business, is the kind you have sent.

Take safety on your vacation; it doesn't cost a thing, unless you forget.

Vol. 18 **approach** No. 1

RADM W. S. Nelson
Commander, Naval Safety Center
Publisher

Our product is safety, our process is education and our profit is measured in the preservation of lives and equipment and increased mission readiness.

Contents

Departments

NavAir 00-75-510

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Credits

APPROACH asked cover artist Chet Engle to feature the S-3A *Viking* on our traditionally patriotic July cover. His painting serves as a reminder that, from the days of John Paul Jones' sloop *Ranger* to the latest carrier-borne aircraft, America's resolve to defend freedom has stood firm. Courtesy Lockheed – California. Pg 29 APPROACH diagrams by Don Lips.

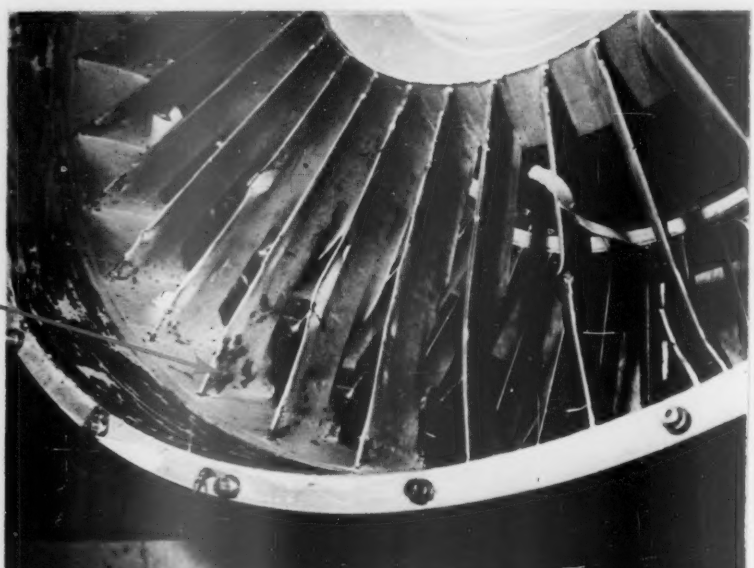
HAL-3 and VAL-4 Disestablished

TWO Navy squadrons which operated "in country" for the past several years have recently been disestablished. The Chief of Naval Operations, in his message of 241244Z March, had the following words of praise for the manner in which the personnel of both squadrons operated.

1. AS THE OPERATIONS OF HAL-3 AND VAL-4 DRAW TO AN END THE HISTORY OF NAVAL AVIATION HAS BEEN FURTHER ENRICHED BY THE UNIQUE CAPABILITIES OF THE SEAWOLVES AND BLACKPONIES AND THE MAGNIFICENT CONTRIBUTION THEY MADE TO THE WAR IN THE REPUBLIC OF VIETNAM. THE PROFESSIONALISM, DEDICATION, AIRMANSHIP, AND BRAVERY OF THE AIRCREWS WHO HAVE SERVED IN THESE TWO GREAT SQUADRONS HAVE BEEN FOREVER EMBEDDED IN THE HEARTS OF THOSE IN THE U.S. AND VN NAVY, THE U.S. ARMY, ARVN, RF AND PF, REMOTE RVN OUTPOSTS, AND CAMBODIAN FORCES WHOSE COMBAT EFFECTIVENESS, AND IN MANY CASES SURVIVAL, WHILE IN CONTACT WITH THE ENEMY HAS BEEN DEPENDENT UPON YOUR COMBAT AIR SUPPORT. THE IMPRESSIVE ACCUMULATION OF INDIVIDUAL AND UNIT AWARDS ALONG WITH THE ENEMY'S DESIRE TO AVOID CONTACT WHERE YOUR PRECISE AND DISCRIMINATE AIR POWER COULD BE BROUGHT TO BEAR, IS FURTHER TESTIMONY OF YOUR COMBAT EFFECTIVENESS. YOUR UNEXCELLED SUPPORT OF RIVERINE WARFARE FORCES IN THE REPUBLIC OF VIETNAM HAS ADDED A NEW DIMENSION TO NAVAL AVIATION.

2. HAVING SERVED AS YOUR COMMANDER I HAVE CLOSE PERSONAL KNOWLEDGE OF YOUR PROFESSIONALISM AND DEVOTION TO DUTY. TO ALL SEAWOLVES AND BLACKPONIES, PAST AND PRESENT, MY MOST SINCERE "WELL DONE" AND PERSONAL CONGRATULATIONS. ADMIRAL E. R. ZUMWALT, JR., CHIEF OF NAVAL OPERATIONS'

JET ENGINES EAT PEOPLE WEARING GREEN, BROWN, PURPLE, RED, BLUE, OR JERSEYS



NEVER TURN YOUR BACK ON A JET ENGINE!

COMFAIRJAX